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THE index for the half year, January 1st to June 30th, accompanies the present number of the ENGINEERING AND MINING JOURNAL. In recognition of the utility of an elaborate index, we bestow upon its preparation and checking so vast a labor, and make it so comprehensive, that its perhaps unique excellence presumably more than offsets the inconvenience of its delayed issue.

THE remains of Captain JOHN ERICSSON, who insisted upon being called an engineer rather than inventor and designer, will be conveyed to Sweden in the new government cruiser "Baltimore," leaving New York to-day. The embarkation at the Battery will be preceded by a marine pageant and a procession on shore, which will include delegations from the several engineering and other societies of which he was a member. A number of war ships, including the "Nantucket," the only available one of the old monitors designed by ERICSSON, will be in column with the Baltimore, awaiting the remains, and as she steams down the harbor past the other ships in order, each will hoist the Swedish ensign in turn and fire the national salute. Thus the nation honors itself in doing honor to one of its greatest benefactors.

THE United States Sub-Treasury in this city began this week to issue the new notes payable in either gold or silver coin in payment for silver purchased under the new law. Mr. BRUSH, secretary of the Kansas City Consolidated Smelting and Refining Company, showed us the first note which was so issued, and which he had received in part payment for a lot of silver bullion. It was number A 1, and was for $1,000. Under the law the Secretary of the Treasury has the option to redeem these notes in either silver or gold coin. Mr. BRUSH presented one of the notes he had received for redemption, and it was immediately redeemed in gold.

IT is stated that ERASTUS WIMAN'S plan for constructing a two-track railway tunnel under New York bay between Rosebank on Staten Island and Bay Ridge in Brooklyn is favored by New York capitalists and railway men. The entire cost is estimated at $6,000,000. Mr. WIMAN is quoted as saying that the transportation of coal alone would make the investment a paying one. In the articles we published recently on "The Future of New York" this tunnel was not considered, but it is manifestly an improvement which will have great results upon the future of the metropolis, which includes both New York and Brooklyn. It is the one thing which Brooklyn needs to make it a self-contained commercial city instead of being what it now is—a mere suburb of New York. The one topographical fact that Brooklyn has plenty of room to grow in, north, east and south, while New York can grow only to the north, being hemmed in between two rivers, makes it likely that eventually Brooklyn will have a greater population than New York City. The completion of a tunnel, which will give it direct railway connection with the rest of the country, will have a great effect upon its progress in this direction.

ONE of the most remarkable strikes or boycotts on record is that of the Brick Manufacturers' Association, which is referred to in "Notes of the Week," under our building material market report. "The Board of Walking Delegates" has demanded of four firms of brick-makers at Verplanck's Point, on the Hudson, that they should discharge all their non-union workmen and employ none but union men. The firms refusing, a boycott of their brick was ordered, and no union bricklayer or other union workman in New York City dare touch one of their brick, and no dealer dare handle them for fear of being boycotted himself. The other brick manufacturers have come to the rescue of the four boycotted firms, and have agreed to stop the shipment of brick to the New York market until the Board of Walking Delegates removes the boycott. It is estimated that this stoppage of the brick supply will throw out of employment over 60,000 men engaged in the different branches of the building trade. The action of the manufacturers' association shows that a "sympathetic strike" may be made by capital as well as by labor. If they will hold together and release the four boycotted firms from their embargo they will take a long step in the direction of emancipating themselves from the control of the "Board of Walking Tyrants."

INTERNATIONAL CONGRESS OF AMERICANISTS.

The organizing committee of the *Congrès International des Americanistes* has sent us the programme for its next meeting, to be held in Paris from the 14th to 18th of October.

The object of this congress is the advancement of scientific studies bearing on America before and shortly after the time of Christopher Columbus. Considering the general interest attached to these investigations, and its special timeliness in view of the Columbian World's Fair now in preparation, we give the following brief details:

The four divisions of the society are: 1. History and Geography; 2. Archeology; 3. Anthropology and Ethnography; and 4. Philology and Paleography. Among the subjects to be discussed are: The genesis of the name "America"; the latest information about CHRISTOPHER COLUMBUS and his voyages; analogies between pre-Columbian American and Asiatic civilizations; the conclusions derived from the studies of the North American mounds; the ancient population of the Isthmus of Panama, whose ceramic industry is represented in the collections of Yale College and the Smithsonian Institute; traces in the English, French, Spanish, Portuguese, and Dutch languages as spoken in America; of the dialect peculiarities prevailing in the provinces whence came the original settlers, etc., etc.

Any subject within the scope of the Americanist Congress can, however, be brought before the meeting if announced in due time to the Secretary of the Congress, M. DÉSIRÉ PECTOR, 184 Boulevard Saint-Germain, Paris.

A NEW ELECTRICAL DIFFICULTY.

A striking example of the unknown conditions with which political electricians are so ready to interfere is furnished by an article in the *Electrical Engineer* of August 6th from the pen of Mr. CHARLES CUTTRISS, the electrician of the Commercial Cable Company, on the influence of electric railroads upon transatlantic telegraphy.

Mr. CUTTRISS shows that the electric railroad from Prospect Park, Brooklyn, to Coney Island produces disturbances in the underground conductors of the ocean cable, although these are at no point less distant than half a mile. He says it is still to be determined whether these effects are

inductive or are due to conduction through the earth and water to the armor of the cables. It is certain that there is no leakage of the cable conductors. We think the phenomenon pretty clearly point to inductive action as a cause. On the one hand, such action would be very strong by reason of the ever-varying electrical current of the railroad conductor. Inductive currents are set up, as all electricians know, not by an absolutely uniform main current, but by fluctuations or reversals of the main current. It is for this reason that the alternating current can be, as the direct current cannot be, "converted" into induced currents of any desired quantity.

Now the current through a railroad motor is constantly varying with its work. The stopping and starting of cars all along the line produce successive fluctuations, which in a neighboring conductor might easily reappear as sudden and brief induced currents. In the case here reported, the effects observed were "kicks," like those caused by thunderstorms and other atmospheric disturbances--for which, indeed, they were at first mistaken.

It must be remembered that the recording instrument by which ocean cables are operated is so sensitive that a current of one-thousandth of a milliampère will give a distinct working signal. Professor GOULD is fond of telling how he once sent a signal under the Atlantic by means of a battery consisting of a simple percussion-cap, with a single drop of acidulated water.

Assuming that the electrical disturbance due to induction is inversely proportionate to the square of distance (which is practically true), we need not be surprised that so delicate an instrument should manifest its effects at the distance of half a mile. Mr. PREECE, the well-known British electrician, claims to have caught a telephone message by induction, across an interval of a quarter of a mile, which is really more wonderful, considering the nature of the currents involved. It should be added that in that case, as in the one just cited, there is a possibility of conduction through the earth.

Telephone and telegraph companies are universally complaining of the induction disturbances caused by electric light and power systems; and it is evident that of the two great departments, if either is to give way, it must be the latter; for we can find substitutes for electric lights and motors, but nothing can take the place of the telegraph and the telephone.

It will not be necessary, however, to sacrifice either of these modern improvements. But the installations of the electric lighting and electric railway companies will have to be more carefully (and in some respects more expensively) arranged. Mr. CUTTRISS thinks that, so far as the railways are concerned, the adoption of a double-trolley system would be a sufficient remedy. Electric lighting conductors cannot be generally permitted to describe wide currents. The outgoing and incoming currents must run side by side, to neutralize their inductive action; or such conductors as the Siemens concentric cable must be adopted.

All these and many other conditions affecting the convenience and safety of the public, as well as the business interests of rival enterprises, need intelligent control. The worst thing that could be done is to leave them to be directed by ignorant or designing law makers and officials. One step better than that is to let the different companies fight it out among themselves, while the public submits to the result. But the only true system is that of a disinterested expert control, unhampered by blind legislation, and supreme over all classes of electrical conductors, whether above or under ground.

THE RAILROAD STRIKE.

"Whom the gods would destroy they first make mad." The leaders of the Knights of Labor, not satisfied with the achievement of two weeks ago in stopping the passenger traffic of the New York Central Railroad for a few hours and the freight traffic for a few days, and in throwing out of employment two or three thousand workmen, whose places have been promptly taken by others, are now threatening to call out the firemen and switchmen on all the roads in the Vanderbilt system, stopping thousands of miles of railroad and risking upon the issue the wages and the position of perhaps 20,000 other men and the existence of the labor organization itself. During the last three years the reputed strength of the membership of the Knights of Labor has declined from a million men to about one-fourth of that number. If the threatened strike takes place it will probably result not only in its total defeat and in incalculable suffering to the families of the deluded men who follow the orders of the leaders and throw themselves out of positions, but in the final disruption of the organization as far as it includes railroad employés.

Fortunately, the issues are clearly stated and well understood by both sides. This is no question of rates of wages or hours of service, and no grievance on which to base an appeal for public sympathy. It is simply a fight on the part of the Knights, the attacking party, for a strategic position from which to organize other strikes in the future, and on the part of the railroad company, as defendants, to maintain what has always been considered the first principle of business management, the right to to deal with employés as individuals, and to hire and discharge them without outside interference.

So much has appeared in the daily press concerning this strike, that the clearly defined issue is apt to be clouded by irrelevant matters. The facts of the case are beautifully brief, and will bear repetition.

About 50 men were discharged from the service of the New York Central Railroad by the superintendents of motive power and other subordinate officers. An official of the Knights of Labor called on third Vice-President WEBB, acting as president, and desired that the question of the rightfulness of the discharge of these men be submitted to arbitration. Mr. WEBB replied to the effect that the men were discharged for cause, and that the question could not be submitted to any outside organization, and that the railroad company, through its own officers, must be the sole judge of the right or expediency of discharging any of its workmen. Thereupon a strike was ordered, and that same evening a number of men, variously reported at from 1,500 to 3,000, left their trains and switches. A blockade of passenger trains took place for some miles out of the New York passenger station.

With magnificent energy and ability, the officers of the road hired other men to take their places, and with their aid and that of those who remained loyal, the road was cleared for passenger traffic by the next morning, and for freight traffic in a few days. Soon the places of all who had left their posts and did not return within three days were filled. This staggering defeat of the Knights should have been enough; but not satisfied with it, the leaders, determined to show their power over the other thousands of men on other railroads who are still willing to submit to their tyranny, have for the past week been making preparations to call out the firemen, switchmen and others on the whole Vanderbilt system. A call was made by Mr. POWDERLY, the Master Workman of the Knights, upon Vice-President WEBB, and the latter told him courteously but firmly that the railroad company would maintain its position, and would under no circumstances submit the discharge of its workmen to arbitration.

So the lines are drawn. At present writing the ordering out of the oath-bound workmen on thousands of miles of road is but waiting a secret conference of the labor leaders themselves. A secret vote in that conference and a cipher telegraphic dispatch will precipitate the calamity. Calamity it will be, for even if in the hundreds of towns to which the strike extends there is not one in which any hot-headed men will make a riot and cause bloodshed, it must result not only in inconvenience to travelers and loss of perishable freight, but loss of wages for a longer or shorter period to those least able to bear such loss, and probable loss of good and permanent positions.

Mr. WEBB is reported to have said in reference to the present strike that "if the firemen leave their engines they will not be taken back." It may seem a hard thing to say, but it seems to us that this is the correct position for the railroad companies to take during the present strike. If it were a strike for higher wages or shorter hours, each individual fireman might consider he had a grievance, and public sympathy might go with him if he struck to better his position; but when a strike is merely for "recognition" of the power of an irresponsible set of "labor leaders," then the act of a fireman striking to coerce an employer who has done him no injury is an act of hostility, of giving aid and comfort to an enemy, of open warfare. He becomes the enemy of his employer, and if the employer refuses to hire over again such an enemy and take him into renewed confidence, who shall say the punishment is not deserved?

It is to be hoped that if the strike is ordered the common sense of the individual firemen and switchmen will be such that they will consider their duty to their families a higher one than their duty to the organization, and that they will remain at their posts, and thus secure the immediate termination of the strike. By so doing they will merit public applause, and will undoubtedly strengthen their position, so that if the time ever comes when they need to strike to remedy a real grievance, the sympathy of all good men will be given them.

THE TAMPING OF DRILL-HOLES.

By Our Special Contributor.

The variety of tamping materials employed in blasting is very large, and the subject has been discussed many times; but I do not remember having seen any mention of a material lately suggested to me by Mr. A. Mezger, a mining engineer of great experience and skill. I refer to jig-tailings about ¼-inch in diameter of grains. Mr. Mezger says that this *crushed and sized* material works much better than sand, packing without any ramming, so as to make a good tamping even for black blasting-powder.

The application is very simple. Into holes inclining downward more than 40 degrees the tailings are charged with a funnel; for holes nearly level or inclined upward, they are filled in cartridges of one thickness of paper, which burst asunder when only slightly pressed with a tamper. The effect is always satisfactory; and as there is no pressure on the primer, this tamping-material is especially to be recommended as dimishing danger in the use of nitroglycerine and its compounds.

Mines where concentration-works are in operation can easily be provided with the material in abundance. R. W. R.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and that of the book buyers, give the retail price? These notices do not supersede review in Journal.]

Gold, Gems and Pearls in Ceylon and Southern India. Compiled by the publishers, A. M. & J. FERGUSON, Colombo, Ceylon. Pages 428, with maps.

Mineral Resources of the United States, 1888. By David T. Day. Published by the Government, Washington, D. C., 1890. Pages 652.

Want and Wealth. A Discussion of some Economic Dangers of the Day. By Edward J. Shriver. Published by G. P. Putnam's Sons, New York, 1890. Pages 38. Price 25 cents.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Hudson River Hematites.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: What can I get for large quantities of brown hematite iron ore with 45 per cent. iron, 2½ per cent. manganese, 0·15 per cent. Phosphorus on the Hudson River, also prices Bessemer, calcium carbonate, with 50 per cent. Fe, on board cars Hudson River?

What is the lowest per cent. a magnetical iron ore may contain to sell, counting only 0·013 Phosphorus, also on the Hudson?

If you have not got the figures handy, send this as a "round robin" to somebody who has. Yours truly, R.

Aluminum in Iron.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Nearly three years ago (this journal, Oct. 29th, 1887, p. 315), I questioned whether the remarkable effect of a minute quantity of aluminum in permitting us to cast extremely soft ingot-iron, very low in carbon, into very thin and difficult castings, was due, as had been positively stated and handed about from mouth to mouth, to a direct lowering of the melting point. I pointed out certain reasons for doubting this, and indicated that the remarkable results observed might be explained otherwise. But the momentum of a tradition, especially when fostered by interested people, and when it offered an obvious and simple explanation of a most striking phenomenon, was not to be checked, and to-day all but the most thoughtful accept this utterly unfounded belief as unhesitatingly as people once believed that the action of the syphon was due to nature's abhorrence of a vacuum. On May 3d, 1889, even Sir Henry Roscoe said unreservedly "aluminum added to molten iron and steel lowers their melting points."*

It was not without a little gratification that I read the following extract from a letter written by the distinguished young metallurgical physicist, Mr. F. Osmond, to a friend. Referring to an alloy which he sent me, ingot-iron containing 0·10 per cent. of carbon and five per cent. of aluminum, Mr. Osmond says that he "heated a sample up to 1,465 degrees C. At this temperature the irregular movements of the pyrometer indicated the approach of the fusing point, and after the experiment was finished and upon removing the tube, actual indications of fusion were met with. It would, therefore, not be beyond the mark to say that the actual fusion would take place at 1,475 degrees C. As ordinary soft steel melts at about 1,500 degrees C, it is therefore very apparent that five per cent. of aluminum has only lowered the melting point about 25 degrees C, in fact, practically nothing. It is, therefore, absolutely incorrect to say that 0·1 per cent. of aluminum lowers the fusion point many hundreds of degrees, as has been stated. All that aluminum can do is to reduce the oxide of iron, make a thin slag, and thus purify the metal, and allow it to run more fluid."

While I think that M. Osmond is here, as in some other cases, a little hasty in his inferences, his experimental skill is beyond cavil, and his results certainly go far to confirm the doubts which I thus early expressed.

As I write, a most striking sample of gray cast-iron lies before me. It was made by adding 3 per cent. of aluminum to common spiegeleisen. The characteristic broad tabular fracture of the spiegeleisen has given place to a fine granular fracture, for all the world like that of common number three pig-iron. I here give the composition of the metal before and after the addition of the aluminum:

	Spiegeleisen.	Gray iron.		Gray iron.
Combined carbon	4·8	0·93	Phosphorus	·05
Graphite	0	3·45	Sulphur	·01
Silicon	...	1·30	Aluminum	3·19
Manganese	13·65	11·75		

This specimen is most suggestive. First we note that aluminum, as has previously been stated, has an effect closely like silicon, in lowering the solvent power of iron for carbon, and thus driving the carbon out of combination and into the graphitic state. Like silicon, then, it opposes the action of manganese, which, like chromium, increases the solvent power for carbon.

The resemblance between the behavior of aluminum and that of silicon at high temperatures early attracted attention. Here we have another striking resemblance, their common power of dislodging carbon during the solidification and cooling of iron.

The great change in its affinities which aluminum seems to undergo rather rapidly at high temperatures leads us to wonder whether, like iron, nickel and cobalt which undergo sudden and remarkable changes at high temperatures, aluminum may not on minute examination be found to possess a distinct critical point, at which its specific heat changes abruptly, with accompanying marked thermal phenomena.

Finally, accumulating facts seem to indicate that the broad tabular fracture of spiegeleisen is not due directly to the presence of manganese, but to the large proportion of combined carbon which that manganese permits the iron to retain. For we find ferro-chrome, whose composition resembles that of spiegeleisen only in its high proportion of combined carbon, with a fracture which most people would pronounce unhesitatingly to be that of spiegeleisen. Further, cast-iron for the basic Bessemer process, whose composition has in common with that of spiegeleisen and ferro-chrome nothing but a high percentage of carbon, has a fracture strikingly like that of spiegeleisen, and the more strikingly like it the higher the proportion of combined carbon. This high proportion of combined carbon is doubtless chiefly due to the intentionally very low proportion of silicon present. And as the lower the silicon, the better the iron for the basic process, so may it be graded by its fracture, the best iron resembling spiegeleisen the most closely. Here is the composition of a pig which had the characteristic spiegeleisen fracture with the iridescence and all:

Combined carbon.	Silicon.	Manganese.	Phosphorus.	Sulphur.
4	·02@·05	0·20	2·7	0·03

Here is another striking fact, bearing on the explanation of the Mitis process. Aluminum was added to some molten steel, which I believe was very soft, if not oxygenated, ingot-iron. It quieted the metal completely, and caused it to pipe deeply. This, of course, is the old story. But what is striking is that little white specks were found on the surfaces of the ingots. They were picked off, analyzed, and found to be alumina!

A very distinguished continental steel-maker lately asserted publicly that the effect of aluminum could not be explained by supposing that it reduced iron oxide, because his chemist had repeatedly analyzed steels on which aluminum exerted its marked effect, and that before the addition of the aluminum they were quite free from oxygen. Visiting his establishment I eagerly sought the details from his chemist, who, to my surprise, informed me that his master had misunderstood him, and that actually he had found oxygen in nearly all the steels, redshort or sound, which he had examined. He had analyzed at least twenty specimens, using the hydrogen method, with the elaborate precautions which Ledebur has described. In one or perhaps two crucible steels he found no oxygen. In all the others he found from 0·06 to 0·12 per cent. Strangely enough, he could trace no connection between the properties of the metal and the proportion of oxygen which they contained. This fact I commend to the consideration of those friends who are quite sure that the burning of iron is essentially due to oxidation.

HENRY M. HOWE.

*Discourse delivered at the Royal Institution, May 3d, 1889, p. 13.

THE SIEMENS-MARTIN FURNACE WITH NEUTRAL SOLE AT THE TAMARIS WORKS.

The manufacture of steel in the Martin furnace on an acid sole necessitates the use of pure and costly pig. The inexpensive treatment of phosphoric pig now furnishes excellent results, thanks to the basic lining of the furnace. The construction and maintenance of this lining, composed of dolomite and magnesia, is delicate in character—the tar which is employed in binding the composition puffs up under the action of heat, and causes swelling of the sole. The blast has to be conducted with the greatest precautions, which causes considerable loss of time. About the year 1881 MM. Vallon and Remaury sought to avail themselves of the eminently refractory property of chrome iron to form the sole and walls of the Martin furnace. With chrome iron ore the construction is much simplified. Large pieces of ore are taken and built in, in blocks. The joints are formed with mortar composed of two parts of triturated chrome-iron and one part of lime as pure as possible. The furnace may be fired as soon as the sole is constructed. There is no fear of cracks or risings. A sole well constructed will last several years without much repair being necessary. The furnace is maintained with limestone, and it is rarely needful to stop gaps with ore, so that the expense for chrome is insignificant except for the stopping of chrome and tar, common to all types of lining. When the furnace is stopped for repairing the body, flues and vault, the sole does not have to be demolished—it is sufficient to repair it with the ore and mortar of lime and chrome. The Tamaris Works were the first to apply the neutral sole instead of the basic sole, and for five years these works have proved the great value of the process. The object at Tamaris is to manufacture extra soft steel or cast iron, replacing Swedish iron, then steel of medium softness for railway material, etc., and more casually hard steel for agricultural and other tools. All these varieties are obtained on the neutral sole with the greatest certainty. For extra soft pig it might have been feared that the chrome iron would be reduced and that the chrome metal would be combined with the iron and furnish a rigid and brittle metal. It is not so, as analysis proves the absence of chrome from the Tamaris steel, and various tests that are made daily show the extreme softness of the metal obtained on the neutral sole and by more varied means. Thus, the extra soft is obtained with proportions of 50, 75 and 90 per cent. of pig and corresponding proportions of scrap iron or ore. In the furnace with neutral sole, the ore process is more easily applicable than on the dolomitic or magnesian sole. This is a very appreciable advantage when pig is low in price and scrap is dear. Siliceous pig is without destructive action on the neutral sole, while it corrodes dolomite or magnesian soles. With regard to the welding properties of the iron cast on the neutral sole, this valuable property is placed out of discussion now. The numerous samples sent by Tamaris to the exhibition show not only that the welding of this metal succeeds well, but also that the joints resist and support the same tests to which iron of the first quality is submitted. The metallurgists are already convinced—the same conviction must spread through the mass of ironworkers. Puddling will then become a thing of the past. But to arrive at this result regular products must be given.

The Martin furnace with neutral sole lends itself admirably to this by the solidity of its construction, the high temperature that it can support, and its relatively low cost for maintenance. The Tamaris Works possess a Martin furnace of six tons, another of eight tons, and a third of 12 tons. The latter was constructed in 1889, and has worked for several months. These three furnaces possess the Vallon-Remaury chrome sole. The production of the first two furnaces is, on an average, 700 tons per month, employing small scrap, such as hoop iron and sheets of second quality. With large scrap, the production is 850 tons. The average production above indicated takes into account the stoppages of the furnaces, which have taken place after sixty to seventy-five days of working. It was always the recuperating chambers which were obstructed by dust from the very small coal employed and the weakened vault which was the cause of the stoppage of the furnace—never the sole.

In the construction of the new Martin furnace, M. Vallon has advised the making of a deposit chamber for the dust before the recuperators. It

is hoped that the furnace will only have to be stopped for repairs at the end of three or four months owing to this arrangement. The chemical composition of the various classes of cast iron and steel, ranging from 1 to 10, is as follows: Carbon from 0·02 per cent. to 1 per cent.; manganese, 0·15 per cent. to more than 1 per cent. All these steels behave well in forging, and temper soft rather than hard, starting from No. 3. They have all a very high coefficient of contraction. Lastly, they accommodate themselves perfectly to uses which require resistance and flexibility.—*La Metallurgie* through *The Colliery Guardian*.

NEW FURNACE-CHARGING DEVICES.

Written for the Engineering and Mining Journal by Henry M. Howe.

Figs. 1, 2 and 3 illustrate Mr. S. T. Wellman's charging-rig for open-hearth furnaces.* The charge of cast-iron and scrap is placed in a series of iron boxes *E*, each lying on a little car *D*. This is done in the stock-room or yard, and these cars are then run in a train to the back of the furnace, and one at a time is brought opposite the charging door, as shown in full lines in Fig. 1. The box is then keyed to the head of the pole *C* of the charging machine, which then rises, carrying the box up and forward till machine and box reach the position shown in dotted lines in Fig. 1. The box is then tipped over, emptying its charge upon the hearth of the furnace, and the machine, after righting the box, returns to its original position, setting the box on its car. The box is unkeyed, the train moved so as to bring the next car with its box opposite the charging door, and the charging is repeated.

With this arrangement one man and one boy habitually charge 38,000 pounds in a melting furnace in 15 minutes, and they have done this in 11 minutes.

Let us now turn to the details of the machine. Its three extremely simple movements are controlled by a man sitting on the seat *F*.

Note that the machine consists essentially of a pole or peel *C*, resting in a peel-frame *O*, suspended from the trolley *K* of an overhead traveling crane. The crane itself runs on the overhead tracks *L L* past the line of open-hearth furnaces, which stand end to end as usual. The trolley traverses the traveler, moving toward or from the furnace, *i. e.*, to the left or right in Fig. 1. being dragged by half-inch wire ropes driven by the hydraulic cylinders *H H'* which are fixed to the body of the traveler, the sheaves *I I'* on their plunger ends giving the trolley double the travel of these plungers. This movement of the trolley, of course, carries peel and charging-box into and out of the furnace.

Next, the peel-frame *O* with the peel *C* and the charging-box, is raised and lowered by the hydraulic cylinder *G*, which suspends it from the trolley.

Finally, the peel is rotated around its own axis, inverting or righting the charging-box, by the hydraulic cylinder *M*. which is shown only in Fig. 3, and whose plunger carries a rack. This rack drives the pinion *N*, keyed to the pole itself.

We find here that simplicity and straightforwardness which characterize Mr. Wellman's designs. There really seems to be nothing to get out of order. The advantage of the overhead traveler, in having its tracks at once where they cannot incommode those walking or working on the charging platform, and where they are not liable to be themselves obstructed, whether by splashings or by piles of ore, sand, lime or ferro-manganese, should not be overlooked.

I understand that Mr. Wellman has made still further improvements on this form of charging machine, which he will describe at the approaching meeting of the Institute of Mining Engineers.

I saw a somewhat similar machine at work at Weissnichtwo. Here the charge was loaded upon a series of peel-heads, shown in Fig. 4, instead of in the boxes which Mr. Wellman uses. These peel-heads were run to the furnace on a train of cars, quite as in Mr. Wellman's arrangement; but the charging machine, instead of hanging from an overhead traveler, ran on rails on the charging platform. It consisted of a peel which, by telescoping, moved these peel-heads one at a time into and out of the furnace. The peel was mounted on trunnions, so as to lift the charge or peel-head from the car on which it rested to the level of the charging-door; and it had a rotary motion about its own axis, so as to spill the charge off from the peel-head upon the hearth of the furnace. I noted that eight men were occupied thirteen minutes in charging seven peelfuls, weighing together twelve tons. This machine was thus rather slower and required much more labor than Wellman's.

Arthur Harrison's charging-rig,† which I saw running very smoothly at Spifton-Extra-Sooper, is shown in Figs. 5 and 6. The machine swings around the column *A D*, its outer end resting on the buggy or truck *C*. It is hence fitted for charging furnaces which stand on the circumference of a circle centred at *A D*, while Wellman's arrangement and that at Weissnichtwo are for furnaces standing in a straight line. The Spifton machine charges ingots in heating furnaces. It has three motions.

First, the whole machine swings around the pillar *A D*, so as to bring the peel *F* opposite the shears whence it receives the blooms to be heated, thence to the door of any of the heating furnaces, where it delivers these blooms, or receives already heated blooms, which it thence swings to hammer or rolls. Second, the little hydraulic cylinder *H* in the truck *C* raises and lowers to the outer end of the peel, so as to raise the ingot, and to lower it, bringing it to rest on the brick supports which receive it on the hearth of the heating furnace. Third, the peel *F* is moved radially, carrying the ingot into or out from the furnaces, by means of the double-acting hydraulic cylinder *G*.

The means of rotating the machine about *A D* remain to be told. Two chains, *k k'*, shown in broken lines in Fig. 6 are each fastened at one end to the pillar *A D*, at the other to one of the hydraulic cylinders *E*, each passing on its way over a sheave on the end of the plunger of the cylinder to which it is fastened. Clearly, if the plunger of the lower or nearer cylinder in Fig. 6 be thrust out to the left, it will pull on chain *k*, and this will swing the machine toward us in the direction of the arrow *l*. Thrusting out the other plunger will in the same way pull on chain *k'*, and swing the machine in the opposite direction. I noted that in 50 seconds after a large ingot had been placed on the peel it was charged in the heating furnace, the peel was drawn back and the furnace door was closed.

Another excellent charging arrangement is Kennedy & Aiken's crane, which is in successful use at the Homestead Steel Works.

* U. S. patents 394, 419 to 394, 421, December 11th, 1888; 408, 152, July 30th, 1889; 421, 797, February 18th, 1890.

†British patent 9,198, July 15th, 1886.

THE COAL FIELDS OF TEXAS.*

By R. S. Weitzel.

The Geological and Mineralogical Survey of Texas was organized in the latter part of September, 1888. Through this source and work done for private parties, prospecting by drilling and some actual coal mining, considerable knowledge of Texas coal fields has been gained. But there still remains much more to be learned on the subject than what is at this time known. The actual mining done so far has been very limited. The First Report of Progress of the State Survey was published last year, and embraced only the work done by it for the first two months after its organization.

The report says: "There are in Texas three distinct coal fields, the central or bituminous, the Texas or semi-bituminous, and the lignitic." Of the central or bituminous field, it says: "It is a combination of the Missourian or fourth coal basin of the United States, of which it is the southern extremity." Its approximate boundary is defined, and it covers, in whole or in part, 25 counties, with an area of not less than 12,000 square miles. Professor W. F. Cummins, geologist for Northern Texas under the State Survey, and whose field of labor covered a large part of this bituminous field, puts the thickness of the formation at about 2,000 feet, with not less than nine seams of coal, ranging in thickness from 2 to 36 inches.; of these, two at least (Nos. 1 and 7), and probably three are workable. Professor Ashburner made a partial examination of these coals in 1879, but saw no coal stratum lower than that found four and a half miles west of Crystal Falls, in Stephens County, which he named the Brazos coal bed. Professor Ashburner says: "The coal strata proper are 85 feet thick, and are included between an upper sandstone and conglomerate and a lower gray limestone. The coal strata contain two beds of workable thickness; the upper, named the Belknap, ranges from 2½ to 4 feet, and the lower, named the Brazos, from 4 to 6 feet in thickness. The coals are said to be high in ash and sulphur, but they have not been thoroughly tested. The Brazos bed includes a large area, and will no doubt prove a valuable commercial coal in some localities.

The amount of coal mining heretofore done in the central field has been and is yet quite limited. Professor Cummins mentions only eight different places; three, possibly four, have been for some years abandoned, and only three of the eight places ever reached that point that entitled them to be dignified by the name "coal mine." These three are: first, the old Gordon mine, located about three miles northeast from Gordon in Palo Pinto County, and about 70 miles west of Forth Worth on the Texas & Pacific Railway, with which it was connected by a short spur track. Here there were two or three different drift openings; the mines were operated three or four years, and a considerable quantity of coal taken out, about all of which was taken by the Texas & Pacific Railroad (by whom the mines were operated. as I am informed), for locomotive fuel. These mines were shut down and abandoned a few years ago, for the reasons given, that the miners were so contentious and troublesome, and the price paid for mining so great, that the fuel could be gotten from elsewhere for less money and trouble. Second the Texas & Pacific Coal Company's mines, located about four miles southwest from Gordon, and just in the edge of Erath county. This company owns about 24,000 acres of land, has two mines, both shafts, one 61 feet deep and the other 74 feet deep, each very well equipped with hoisting machinery, and the balance of their plant is very good. They are now producing about 600 tons of coal per day, all of which is taken by the Rio Grande division of the Texas & Pacific Railroad for locomotive purposes. Third, the Palo Pinto Coal Company's mine, about two and a half or three miles from the one last mentioned. This is a shaft opening also, but only about 45 feet or 50 feet deep. They have about 2,000 acres and a very fair small plant, producing about 100 tons per day. The system of mining at the old Gordon Mine, at the Texas & Pacific Coal Company's mines and the Palo Pinto Coal Company's mines, is the long wall. The present price paid is $1.15 per ton where the floor is fireclay, and $1.45 per ton where the floor is sandstone. Day wages $1.75 to $2.25. The Texas & Pacific and the Palo Pinto Coal Companies prepare their coal for market by screening over ¼ to ½-inch mesh screens. The seam, the No. 1, at the above mentioned mines ranges from 18 to 30 inches thick, and has one persistent band of slate from ¼ to 1 inch thick; the roof is either slate or soapstone, and the floor generally fireclay, though in places it is sandstone. The State report does not give any analysis of the coal, and the only published analysis of it I have seen shows it heavy in ash and sulphur and corresponding very closely to the coal of Leavenworth, Kan. Ten miles west of Decatur, in Wise County, a mine was opened a few years ago. Considerable prospecting was done, and this mine is still operated, the coal being used in the immediate vicinity. The seam in which it is found is 30 inches thick, and the coal is of good quality. Four miles west of Bowie, in Montague County, is a mine, the seam being 30 inches thick, with a clay parting 3 inches thick. Professor Cummins also reports considerable coal taken out at different times from seam No. 7 and various places about Cisco on the Texas and Pacific Railroad, about 115 miles west of Fort Worth, but he does not put much faith in the seam being of value in that vicinity.

The Neuces or semi-bituminous field lies in the southwestern part of the State bordering on Mexico. It has an area of not less than 3,700 square miles; its northern boundary is not yet determined. It contains two workable seams of coal, and in some places three. The upper seam (or middle one, as I understand, where three seams exist) is from 18 to 58 inches thick, with a 2-inch slate parting in the center, and is being worked at San Thomas. Mr. J. Owen, who had charge of the State survey in this section, says of this coal: "This coal does not belong to any of the other classes of coal found in the United States, so far as I know. It is a very firm, solid coal, and breaks with a glossy conchoidal fracture,

* Abstract of a paper read before the Ohio Institute of Mining Engineers.

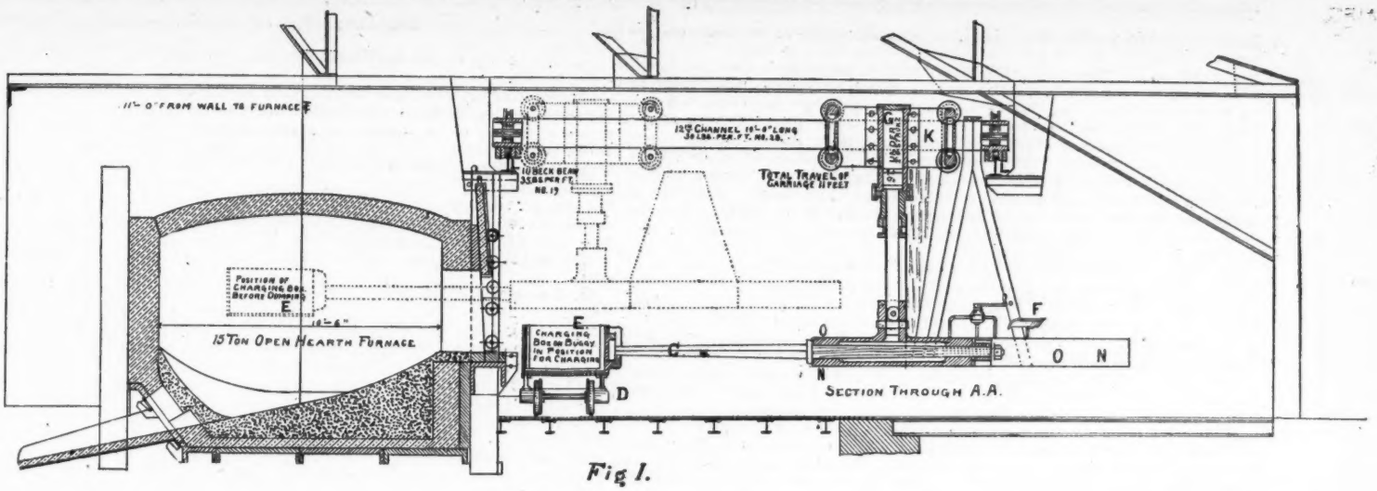


Fig I.

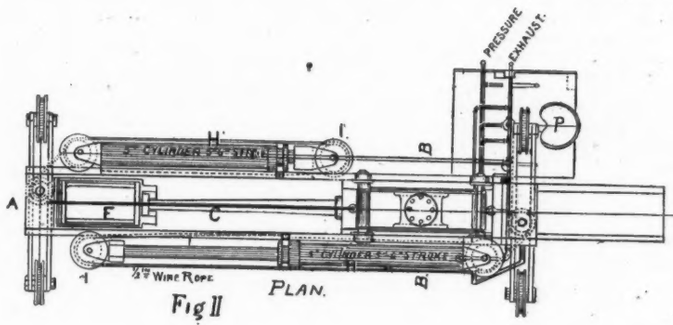
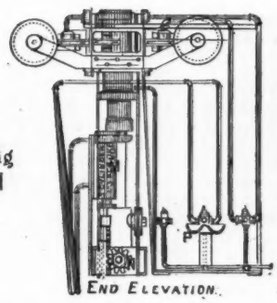


Fig II

Fig III



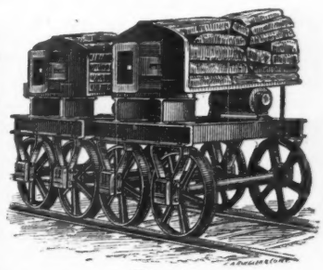
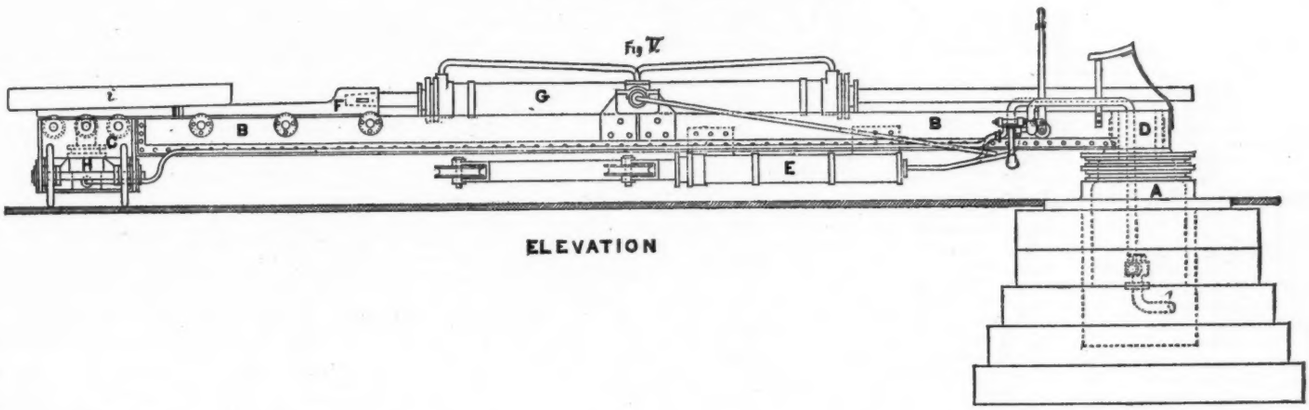
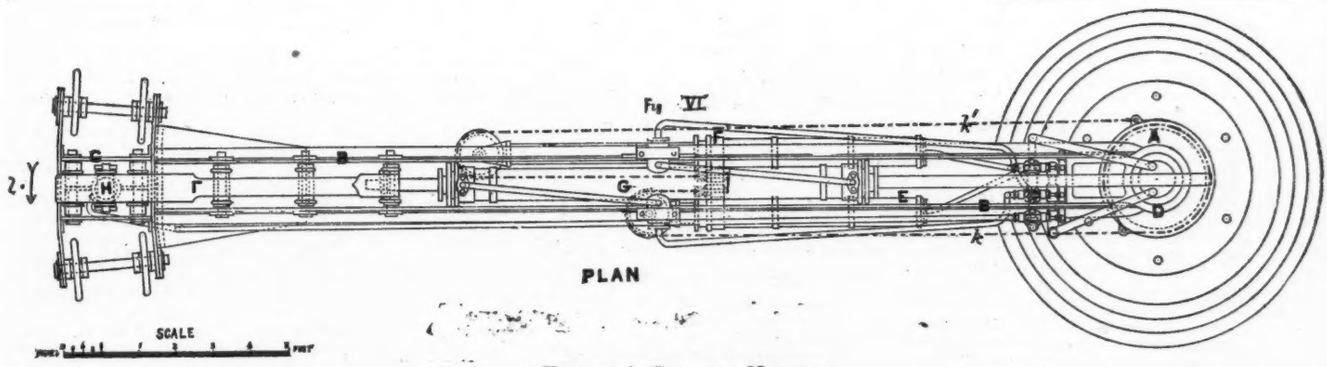


FIG. 4.

CHARGING CAR AT WEISSNICHTWO.

S. T. WELLMAN'S CHARGING APPARATUS.





HARRISON'S CHARGING MACHINE.

and is not easily pulverized. It is very clean and free from dust, and has the appearance of hardened asphaltum. It contains but few plant impressions, is remarkably free from sulphide of iron, burns with a vigorous, bright flame and oily appearance. It contains a considerable quantity of ash, but will not make clinker if separated from the slate in the center of the seam. It has some of the characteristics, but none of the slaty fracture of cannel coal. It has been unwittingly called lignite by some, but it has none of the characteristics of lignite, and is much superior to it in quality. This ought to be a good gas coal, and for use in stoves and grates it is superior to the common variety of the bituminous. It will answer very well for making steam where the ash boxes are properly constructed, and will make an excellent fuel for use in reverberatory smelting furnaces, but has not enough fixed carbon to be used in a blast furnace or for blacksmith work."

The lower seam in this field outcrops 4½ feet thick at Eagle Pass, several miles northwest of San Thomas, and up the Rio Grande, showing along both sides of the river for a distance of 10 miles. The abrupt inclination of the stratum at this place carries it below the surface, and its eastern

boundary could not be determined. The stratigraphical position of this seam is 600 to 700 feet below the Neuces or San Thomas seam. The only place this coal is mined is at the Hartz mines, near Eagle Pass, where it is mined quite extensively. Mr. Owens reports measuring this seam at three different places in the Hartz mines; at one place he found 4 feet 6 inches of good coal without any slate parting, at another place 5 feet 4 inches, with three divisions of slate, aggregating 5 inches in thickness, and at the third place 7 feet 3 inches, with five divisions of slate aggregating 5 inches in thickness. Mr. Owens says of this coal that it is a good commercial article, and appears to be very firm and hard. Albertite is also reputed found in this field in some quantity. It is northeast of the San Thomas exposure, and it is believed it will prove valuable. No analysis is given of coals in this field.

The lignitic field is quite large, although its approximate area is not given. It includes in whole or in part 54 counties. Four and possibly five strata of lignite have been recognized, one of which attains a thickness in many places of 15 to 20 feet. The others vary in thickness from a few inches to 5 feet. The quality of the lignite is extremely variable, being in places good and clean and in others it contains a great deal of sulphuret of iron. Very little work has been done in this field, it hitherto having been regarded as of little or no value. Chief Geologist Dumble attributes this impression to two causes—first, the quality it possesses of rapidly crumbling and slacking when exposed to the air; and, second, because nearly all who have attempted to use it have done so without first studying its character and the best methods of burning it, they having, in most cases, endeavored to use it under the same conditions which apply to a heavy bituminous coal containing little water. He asserts that in Europe lignites of much purer quality than those of Texas are successfully used for domestic purposes and for smelting; and, further, that at San Antonio, Tex., where firewood is somewhat scarce and bituminous coal expensive, very satisfactory results have been secured in burning these lignites by using grate bars close together. It contains from 15 to 20 per cent. of moisture, and varies considerably in chemical composition, containing from 16 to 50 per cent. of volatile matter, 20 per cent. to almost 60 per cent. of fixed carbon, and 4 to 14 per cent. of ash. It is thought by those engaged in the State survey that the lignites may yet prove to be quite valuable, and efforts are being made to determine the lines of its greatest utility. In conclusion, I would say that Texas is rapidly awakening to the importance of cheap fuel; her citizens are beginning to see that it is the key to manufacturing, and that manufacturing means wealth, prosperity and happiness."

BLAST FURNACE WORK.

Our highest living authority on blast furnace work is Sir I. Lowthian Bell. Consequently, any contribution he may make to the literature of the subject is of much interest to furnace owners and to the iron trade in general. At the annual meeting of the Society of Chemical Industry, of which he is the retiring president, Sir Lowthian devoted his address entirely to the chemistry of blast furnace work, which he dealt with in a very interesting manner. To metallurgical chemists the address was of special importance, but it was of moment also for iron masters. Having dealt with the saving of fuel obtained by the adoption of the hot blast, as well as the greatly increased output of pig iron obtained by that method of working, Sir Lowthian discussed in detail the subject of the advantages derived from increasing the height of the blast furnace.

Mr. John Vaughan built a furnace 71 feet in height, because he expected to increase the make, and in that he was not disappointed. The loftier stack did greatly augment the output, but it also saved a notable quantity of coke—something like four hundred-weight per ton of iron. Later on, at the Clarence Works, the height was increased to 80 feet, with the net result that the coke used per ton of iron made fell to 22·5 hundred-weight, as compared with 28·5 hundred-weight in the old 8-foot furnace. This economy being established, an iron-master thought he could get still better results by building furnaces 100 feet in height. He built his two 103½ feet high, and when they were at work reported that he was making a ton of iron with 18 hundred-weight of coke. Sir Lowthian thought this was impossible, because it was a saving of four hundred-weight, which was 30 per cent. more than the entire loss of heat in the waste gases of an 80-foot furnace, and upon careful investigation found it was a mistake to imagine that there was any such difference in the consumption of coke as had been supposed. He thought, therefore, that a height of 80 feet and a capacity of 16,000 cubic feet would suffice to insure all the efficiency we could expect in this direction.

As to the use of limestone or lime, Sir Lowthian gave particulars of sundry experiments which had been made with calcined limestone. Caustic lime had been tried at various times and by different iron-masters, but not with success. So far back as 1875, indeed, he had shown that in 80-foot furnaces there was no economy in using caustic lime, and had described the reasons why that should be the case. With regard to the chemistry of the reduction of oxide of iron in the blast furnace, Sir Lowthian's facts and figures are too involved to be reproduced here, but we may note that he differs from Deville and Cailletet, and adds that he regards it to be practically impossible in a blast furnace to completely convert CO into CO_2 in reducing iron oxide.

At the conclusion of the address Sir Lowthian referred to the fact that the duty performed by the blast furnace is by no means equivalent to the whole of the useful effect which coke is capable of affording. Taking a ton of coke as being able to produce 20 hundred-weight of pig iron from Cleveland ironstone, that represents 147,200 calories, whereas about 90,000 calories has been the limit of the power actually obtained. "This apparent sacrifice of nearly 40 per cent. is incurred by what is considered the physical impossibility of bringing, in this particular process, the whole of the carbon burnt to its highest point of saturation with oxygen." But the unexpended energy of the fuel is not wasted, as was formerly the case. It is caught and burned under the boilers in the hot-air stoves, and at the Clarence Works, for the evaporation of brine. Thus, although there is a considerable apparent loss of heat, it is not wasted by any means, but is made to subserve many very useful functions in connection with the operations of the furnaces. Much may yet be done in the way of fuel economics, but Sir Lowthian is justified, as matters stand now, in "attempting," as he says, "to establish for the blast furnace a character for an economical use of fuel."—*London Ironmonger.*

THE ANNEALING OF COPPER.*

By G. Wyckoff Cummins, New York.

Copper is at present almost universally annealed in muffles, in which it is raised to the desired temperature and subsequently allowed to cool either in the air or in water. It is necessary to watch the copper carefully, so that when it has reached the right temperature it may be drawn from the muffle and allowed to cool. If the copper is heated to too high a temperature, or is left in the muffle at the ordinary temperature of annealing for too long a time, it is "burnt," as the workmen say. Copper that has been "burnt" is yellow, coarsely granular, and exceedingly brittle—so much so that in some samples it cannot be bent once at a right angle without breaking. It is even more brittle at a red heat than when cold.

In the case of coarse wire it is found that only the surface is "burnt," while the interior is damaged to a far less extent. This causes the exterior to split loose from the interior when bent or when rolled, thus giving the appearance of a brittle copper tube with a copper wire snugly fitted into it. Cracks a half inch in depth have been observed on the surface of an ingot on its first pass through the rolls, all due to this exterior "burning." It is quite apparent that copper that has been thus overheated in the muffle is entirely unfit for rolling, either for rods or sheet copper or for wire drawing. It is found that the purer forms of copper are far less liable to be harmed by overheating than samples containing even a small amount of impurities. Even the ordinary heating in a muffle will often suffice to "burn" in this manner the surface of some specimens of copper and thus render them entirely unfit for further working. Copper that has been thus ruined is of use only to be refined again.

As may be inferred from the above, only the highest grades of refined copper are at present used for drawing or for rolling. This is not because the lower grades, when refined, cannot stand sufficiently high tests, but because the present methods of working are not adequate to prevent these grades of copper from experiencing the deterioration due to overheating. This is unfortunate for the manufacturer, since, I understand, he has to pay cash in advance for the highest grades of refined copper.

In order better to appreciate the explanation of the various phenomena of copper annealing, let us see what refined copper is. The process of refining copper consists in an oxidizing action followed by a reducing action which, since it is performed by the aid of gases generated by stirring the melted copper with a pole, is called poling. The object of the oxidation is to oxidize and either volatilize or turn to slag all the impurities contained in the copper. This procedure is materially aided by the fact that the suboxide of copper is freely soluble in metallic copper and thus penetrates to all parts of the copper and, parting with its oxygen, oxidizes the impurities. The object of the reducing part of the refining process is to change the excess of the suboxide of copper to metallic copper. Copper containing even less than one per cent. of the suboxide of copper shows decreased malleability and ductility, and is both cold short and red short. If the copper to be refined contains any impurities, such as arsenic or antimony, it is well not to remove too much of the oxygen in the refining process. If this is done, "overpoled" copper is produced. In this condition it is brittle, granular, of a shiny yellow color, and more red short than cold short. When the refining has been properly done and neither too much nor too little oxygen is present, the copper is in the condition of "tough pitch," and is in a fit state to be worked.

"Copper is said to be tough pitch when it requires frequent bendings to break it, and when, after it is broken, the color is pale red, the fracture has a silky lustre, and is fibrous like a tuft of silk." On hammering a piece to a thin plate it should show no cracks at the edge. At tough pitch, copper offers the highest degree of malleability and ductility of which a given specimen is capable. This is the condition in which refined copper occurs in the market, and if it could be worked without changing this tough pitch, any specimen of copper that could be brought to this condition would be suitable for rolling or drawing. We have seen that tough pitch is changed if we either add oxygen to or take oxygen from refined copper.

By far the more important of these is the removal of oxygen, especially from those specimens that contain more than a mere trace of impurities. This is shown by the absolutely worthless condition of overpoled copper. The addition of carbon also plays a very important part in the production of overpoled copper.

That the addition of oxygen to refined copper is not so damaging is shown by the fact that at present nearly all the copper that is worked is considerably oxidized at some stage of the process, and not especially to its detriment.

Let us see how the above facts are related to the process of annealing copper. I have already referred to what is known as "burnt" copper. This is nothing more nor less than copper in the overpoled condition. This is brought about by the action of reducing gases in the muffle. By this means the small amount of oxygen necessary to give the copper its tough pitch is removed. This oxygen is combined with impurities in the copper, and thus renders them inert. For example, as explained by Dr. Peters, the oxide of arsenic or antimony is incapable of combining more than mechanically with the copper, but when its oxygen is removed, the arsenic or antimony is left free to combine with the copper. This forms a very brittle alloy, and one that corresponds almost exactly in its properties to overpoled copper. To be sure, overpoled copper is supposed to contain carbon, but that this is not the essentially ruining principle in case of annealing is shown by the fact that pure copper does not undergo this change under conditions that ruin impure copper, and also by the fact that the same state may be produced by annealing in pure hydrogen and thus removing the oxygen that renders the arsenic or antimony inert. No attempt is made to deny the well-known fact that carbon does combine with copper to the extent of 0·2 per cent. and cause it to become exceedingly brittle. It is simply claimed that this is probably not what occurs in the production of so-called burnt copper during annealing. The amount of impurities capable of rendering copper easily "burnt" is exceedingly small. This may be better appreciated when it is considered that from 0·01 to 0·2 per cent. expresses the amount

* From *Scientific American.*

of oxygen necessary to render the impurities inert. The removal of this very small amount of oxygen, which is often so small as to be almost within the limits of the errors of analysis, will suffice to render copper overpoled and ruin it for any use.

It is quite apparent that a really good method of annealing copper will prevent any change in the state of oxidation. To accomplish this it is necessary to prevent access to the heated copper both of atmospheric air, which would oxidize it, and of the reducing gases used in heating the muffle, which would take oxygen away from it. Obviously the only way of accomplishing this is to inclose the copper when heated and till cool in an atmosphere that can neither oxidize nor deoxidize copper. I find that by so doing copper may be heated to the melting point and allowed to cool again without suffering at all as regards its pitch. There are comparatively few gases that can be used for this purpose, but, fortunately, one which is exceedingly cheap and universally prevalent fulfills all requirements, viz., steam. In order to apply, then, in practice the principles already enunciated, it is necessary only to anneal copper in the ordinary annealing pots, such as are used for iron, care being taken to inclose the copper while heating and while cooling in an atmosphere of steam. This will effectually exclude air and prevent the ingress of gases used in heating the annealer. Twenty-four hours may be used in the process, as in the annealing of iron wire, with no detriment to the wire. This may seem incredible to those manufacturers who have tried to anneal copper wire after the manner of annealing iron wire. By this method perfectly bright annealed wire may be produced. Such a process of annealing copper offers many advantages. It allows one to use a grade of copper that has hitherto been worked only at a great disadvantage, owing to the ease with which it gets out of pitch. It allows one to use annealers such as are ordinarily used for annealing iron, and thus cheapens the annealing considerably as compared with the present universal use of muffles. There is no chance of producing the overpoled condition from the action of reducing gases used in heating the muffles. There is no chance of producing underpoled condition due to the absorption of suboxide of copper. None of the metal is lost as scale, and the saving that is thus effected amounts to a considerable percentage of the total value of the copper. The expense and time of cleaning are wholly saved. Incidentally bright annealed copper is produced by a process which is applicable to copper of any shape, size or condition, a product that has hitherto been obtained only by processes (mostly secret), which are too cumbersome and too expensive for extensive use, and, as is the case with at least one process with which the author is acquainted, with the danger of producing the overpoled condition, often in only a small section of the wire, but thus ruining the whole piece.

If it is desired, the copper may be annealed in an apparatus so arranged that the copper when heated may be dropped into a body of water without access of air, and thus make a far smaller annealing plant suffice. It may be mentioned that copper seems to be made neither softer nor harder by being cooled suddenly in this manner than if cooled slowly, though some of the alloys of copper are rendered somewhat softer by a sudden cooling; in fact, there is not the slightest evidence anywhere to justify the quite prevalent belief that an art of hardening copper was known to the ancients. The hardest tools of the ancients were made of bronze, not copper.

By application of the same principles it is possible to prevent both deoxidation and oxidation in the heating of copper ingots for the rolls, and thus, by keeping copper at tough pitch all along, any copper that can be given tough pitch can be used for rolling sheet copper or for wire.

I think it also practicable to produce bright copper rods direct from rolls.

A BRIDGE ENGINEERING FEAT.

The main channel span of the Ohio River Railroad bridge, connecting Brunot's Island, just below Pittsburg, with the mainland, was moved to its final resting place on the 19th inst., with the precision, foresight, and skill which place the American engineers in the vanguard of this branch of the profession.

The Keystone Bridge Company, the contractors, had adopted a method of constructing the bridge and putting it in place which had been used before, for instance, by the Union Bridge Company, of New York, in bridging the Hawkesbury River in New South Wales, but the length (525 feet) and weight (1,800 tons) of this span, as well as the height (80 feet) to which it was to be raised, were such as to make the present feat in itself noteworthy.

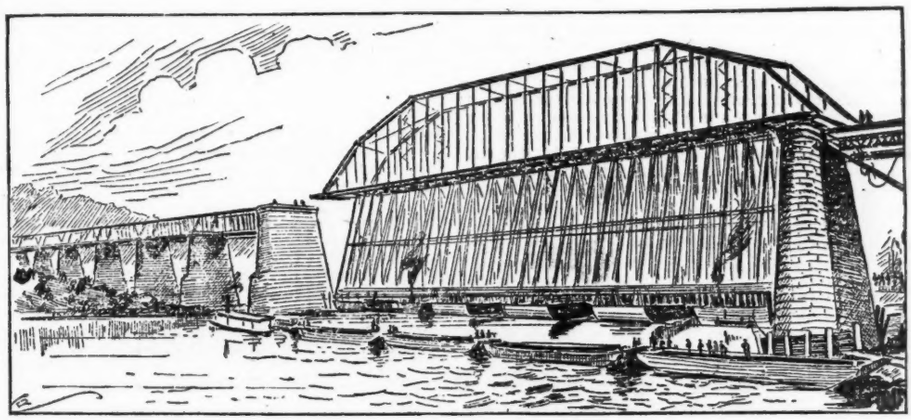
The bridge was built on false work and afterwards floated to its position; the new feature was that the false work was not erected directly on pontoons, but on piles high enough to admit of introducing barges under the false work to sustain it and subsequently float it at will. The pontoons used were nine ordinary Monongahela standard coal barges.

At 7 o'clock in the morning work was begun, and numerous ropes were passed from the piles to the winding engines, and from the barges to the shore, the former to move the float clear of the piles, the latter to steady and, when necessary, hold it on its way through the water. These ropes were frequently changed during the day to correspond with the changing position of the structure. At 8 o'clock the barges began to manœuvre out from among the piles; within 30 minutes an advance of 25 feet was made; half an hour more and the flotilla of barges was half way through the piles. At 11 o'clock the north end of the squadron was clear of the piling, and at noon the huge mass of wood and iron work was cut from its moorings. (The southernmost end had to be kept as close to the shore as possible, so as to drop down into position between the piers.) At 2:30 the barges were well out in the stream and lying at an angle of 45 degrees with the viaduct. The situation at 5 o'clock is shown in our illustration, which is taken from the Pittsburg *Dispatch* of the 20th inst. At 6 o'clock one corner of the northeast end was suspended above the masonry, and at 7 o'clock the steel span reposed in permanent position on its bed.

The proceedings throughout were marked by cautious, circumspect and effective management, unattended by excitement and accidents of any kind. The chief engineer of the Keystone Bridge Company, Mr. C. L. Strobel, and the superintendent of construction, Mr. George R. Buchan, were in charge of the work.

LUMAGHI'S APPARATUS FOR THE REDUCTION OF ARGENTIFEROUS ORES.

The apparatus herein illustrated, for which letters patent have been recently granted to Dr. Octavius Lumaghi, of St. Louis, Mo., is an improvement of the processes in use for the reduction of argentiferous and other zinc ores. It is a practical system of upward distillation, that yields a zinc always free from lead and silver, and consiss in an apparatus with an inclosure with doors, and a suction device which by its action saves all the metallic vapors by drawing them through the inclosure to receptacles provided for the purpose, while the lead and the silver, if present in these ores, are left in the retorts with the metals that are not obtainable by distillation. After all the zinc has been removed from the ore in the form of spelter or as white oxide of zinc, the ore material, by reason of the treatment it has been subjected to, is in the best state of preparation for further treatment for the recovery of gold and silver. The combined use of these means enables the operator to supersede the process of distillation by that of oxidation whenever the distillation becomes too slow to be profitable, and thus by merging the two processes into one continuous operation, to recover all the metals present in these ores, including all the zinc burned in the flame of the condensers, while the distillation is going on, and then to recover also the zinc that could not be obtained as spelter in the form of white oxide of zinc, while the ore material left in the retorts still holds all the metals not obtainable by distillation.



A BRIDGE ENGINEERING FEAT.

One feature of this invention is the connection to the upper, part of the retort of a condenser which is so adjusted and inclined that when the distilled zinc is suffered to gather in the condenser until it overflows, it cannot flow back into the retort; and any metal present in the ore, that at the temperature and under the conditions attending the distillation of zinc becomes liquid, cannot possibly rise to the condenser adapted to the upper end of the retorts; the liquefied lead and silver, if present in any proportion, must remain in the retorts and may be drawn at any time by tapping the bottom-notch of the retort-stopper. Although lead and silver may be partially volatilized when heated in contact with the atmosphere, no trace of these metals is found with the zinc obtained by upward distillation. It may here be shown how in the manufacture of spelter by downward distillation, as is in common use, where the zinc is drawn downward to the condenser connected below the charging end of the retort, the lead and other metals that may become liquefied inside of the retorts during the process of distillation naturally gravitate toward the spelter gathered in the condensers connected below the retorts and become alloyed with it, and as the gases in the retorts can only be drawn downward by being crowded under a pressure sufficient to overcome their buoyancy, the vapor of the zinc is thus

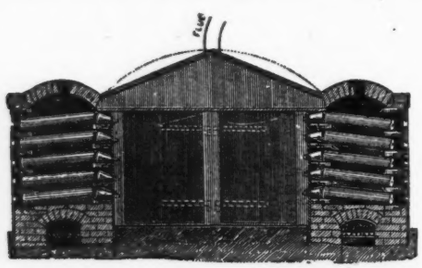
subjected, in its nascent state, to a steady pressure and a protracted friction against the sides of the retorts as it proceeds from the point of its evolution from the ore all the way down to the condensing apparatus. This has the effect of hardening the spelter thus produced and to cause great loss of zinc by forcing the vapor into the pores of the retorts, especially when newly placed. This friction under pressure also facilitates the combination of the metals present in the ores with the refractory material of the retorts, reducing their diameter by clogging them with the silicates of zinc or perforating them by the formation of liquid silicates when iron and other destructive metals are present. All this is avoided when the distillation is carried on upward as described, where the zinc vapor rises unobstructed to the condenser above, free from undue pressure, thus preserving the retorts for a long time, yielding a metal always free from all metals not obtainable by distillation, and producing a spelter softer and more malleable than the common article produced by downward distillation. In the present state of the art the bulk of the spelter produced is the product of the distillation downward, with the exception of the Silesian spelter, which is the product of distillation upward as practiced in Silesia, where the zinc vapor is passed out from the uppermost point of the crucible or muffle, as used in that country, to the condensing apparatus. That spelter is imported in this country and commands a high price owing to its mode of preparation, a fact which speaks for itself.

Another feature of this invention is the continual use of a suction fan or device which is connected by a duct to the inclosed space of the structure, and is designed to gather and save all the fumes produced during the processes of distillation and of oxidation.

While the distillation is carried on, all the doors of the structure are left wide open, so that the action of the fan serves to ventilate the space between the furnaces, facilitating the labor of attending to the condensers; while the same currents of air, drawn through the open doorways for the purposes of ventilation, are at the same time made use of to gather the fumes coming from the charge through the condensers into the space, and to carry them without waste to receptacles provided for the purpose.

After the ordinary process of distillation has been carried on so far that the percentage of zinc remaining in the charge has been reduced somewhere below 15 per cent., the impoverished condition of the ore remaining in the retorts will cause the distillation to become slow, only little liquid metal being then obtained; the slow generation of the zinc vapors causes the formation, not of liquid metal, but of a zinc powder which can only be transformed into bars at the further expense and loss of another distillation. This reduced percentage of zinc, that can no longer be distilled speedily enough to be profitable, can nevertheless be recovered without loss or expense by following the ordinary process of distillation by sublimation of the zinc still remaining in the charge; the two methods follow one another as one continuous process, thus producing the white oxide as well as the distilled zinc at one single operation, thereby exhausting all the zinc in the ore and accomplishing the reduction in less than half the time required by the old methods. By the time the spelter gathered in the condenser has been removed in the usual manner, the charge in the retorts will have subsided sufficiently to admit of a draught of air lengthwise through the retorts to oxidize the metal still remaining in them. To this end one of the upper notches of the retort-stopper of each retort is opened, or its luting is removed, and the charge is stirred with a rod thrust through said perforations.

All the doors of the inclosure being then carefully closed, the draught of air drawn through the retorts by the suction device will cause the zinc still remaining in the charge to be rapidly oxidized and drawn through the forward end of the condensers into the inclosed space, and by a duct to pass the white oxide of zinc to receptacles which may be either bags or a



tank containing water. Thus it will be seen that, the doors being closed, the air displaced by the suction device is necessarily drawn from the outside of each furnace through the perforations of each retort-stopper as a blast over the charge lengthwise of the retort across the space to the receptacles. This not only serves to carry off and save the white oxide of zinc, but expedites the process generally by favoring the combustion of the coal in the charge, and shortening the time for the reduction; thus with the same means all the above operations are carried on.

The spelter is collected separately from the lead and silver. The lead and such silver as may be alloyed with it are collected by themselves, the zinc oxide is formed and collected, and any precious metal that may become sublimated with the oxide of zinc during the operation, is saved It may be added that the ore material remaining within the retorts has, in effect and by reason of the treatment to which it has been subjected, been roasted, and thus made ready for subsequent treatment elsewhere, according to any of the well-known methods for the recovery of gold and silver. Another feature of this invention is that when reducing the argentiferous carbonates or silicates of zinc the ore can be charged without previous roasting, it being ground, not too fine, and mixed with a proper proportion of small coal. After charging the retorts in the usual manner the retort-stopper is applied to the lower end of the retort, but the luting of the notches is deferred until the ore in the retort has taken on a dull cherry heat. Then after carefully luting to exclude the air, the distillation is allowed to proceed. Owing to the construction of the retorts, which allows the escape of the gases upward, these ores are roasted without loss of silver and the distillation is carried on to the end without perceptible delay.

This feature of the invention is of great practical advantage in reducing zinc ores associated with several metals, especially iron and manganese, as it will be found by actual experience that the ore of zinc becomes prepared for reduction, that is, roasted, sooner than the other ores associated with it, so that, by the use of a suitable apparatus, the distillation of the zinc may be completed before the other metals become reduced sufficiently to form the combinations with the refractory material of the retorts that it is so desirable to avoid. The length of time necessary to the profitable roasting of the different ores according to their affinities opens up an interesting field of research.

NOTES ON FLORIDA PHOSPHATE BEDS.

Written for the Engineering and Mining Journal by Francis Wyatt, Ph. D.

The examinations which furnish the data for this contribution were made over about 75,000 acres of land, divided up into small tracts and more or less widely scattered throughout the following counties: Jefferson, Madison, Hamilton, Taylor, Suwanee, Lafayette, Bradford, Alachua, Putnam, Marion, Levy, Citrus, Sumpter, Pasco, Orange, Hillsboro and Volusia.

Since there has been, up to the present time, no systematic or correct geological or topographical survey of Florida, it will be of interest to state in a general way that,

TOPOGRAPHICALLY,

it is low lying and gently undulating; the highest point being not more than 250 feet, and the average about 80 feet above sea level.

The elevated points or ridges are almost entirely composed of sand, and are covered with a very luxuriant growth of tall pines. The depressions, or valleys, especially when situated along the coast, are composed of a mixture of calcareous marls and sand, from which outcrop at irregular but frequent intervals large and small boulders of limestone, sandstone or phosphate rock. These valleys are principally known in the country as "Hammack land," and are said to be very fertile—agriculturally speaking. When uncultivated, however, they are covered with a dense, wild growth of vegetation, characteristic of the swamp.

GEOLOGICALLY,

and, again dealing in broad generalities, I have convinced myself that the entire State is underlaid, though at greatly varying depths, with Upper Eocene limestone rocks, and that the first emergence of Florida must be dated from that period. Addressing myself to colleagues and co-workers (in a professional and business sense), I shall disregard details, and shall assume that during the succeeding or Miocene submergence there was deposited upon these Upper Eocene limestones—more especially in the cracks or fissures resulting from their drying up—a soft, finely disintegrated calcareous sediment or mud. The gradual evaporation of these Miocene waters brought about the formation, principally in the neighborhood of the rock cavities and fissures, of large or small estuaries. These estuaries were replete—swarming—with life and vegetable matter: fish, molluscs, reptiles and marine plants. They were, besides, heavily charged with gases and acids, and their continuous concentration ultimately induced a multiplicity of readily conceivable processes of decomposition and final metamorphism.

In the estuaries and banks thus formed by the deposition and evaporation, or subsidence, of the Miocene seas we shall find the origin of our phosphates of lime, and, disregarding all other hypotheses, I shall consider that, roughly and practically, we are contemplating at this point,

1. A foundation of Upper Eocene limestone rocks very much cracked up and fissued, the cracks having a general trend N. E. and S. W.

2. Irregular beds, pockets, or banks of Miocene deposits, dried and hardened by exposure, alternately calcareous, sandy or marly, generally phosphatic, and sometimes entirely made up of decomposed organic débris and phosphoric acid, combined with various bases (lime, magnesia, iron, alumina, etc).

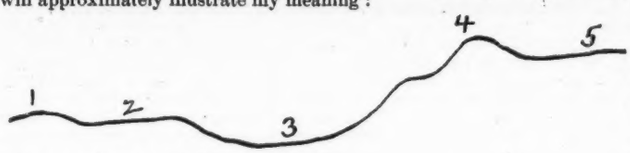
After the disappearance of the Miocene sea there came some gigantic disturbances of the strata. There were upheavals and depressions. The underlying limestones were probably again split up and displaced and the Miocene deposit was broken and hurled from the surface into yawning gaps, and from one fissure to another.

Now came the Pliocene periods or end of the Tertiary, and then the seas of Quarternary age, with their deposits and drifts of shells, sands, clays, marls, boulders and other transported material.

Each successive change was, of course, accompanied by the alternate or concurrent influences of cold, heat and pressure.

Taking a comprehensive and intelligent view of all these phenomena, it must be concluded that those portions of the phosphatic Miocene crusts which did not fall into permanent limestone fissures or caverns at the time of the disturbance of the strata became at length very thoroughly broken up and disintegrated. They were rolled about and intermixed with sands, clays and marls and were deposited with them in various mounds or depressions, in conformity with the violence of the winds or the waters, or with the uneven structure of the surface to which they were transported. Occasionally this drifting mass found its way into very low-lying portions of the country—say into those regions where considerable depressions were brought about by the sinking or settling of the recently disturbed mass—at other times it was rolled to, and deposited on, slightly higher points. In the first of these cases we expect to find, and do find, a vast and complete agglomeration (comparable to an immense pocket) of broken-up phosphate rock, finely divided phosphate—débris, sands, clays and marls, all heterogeneously mixed in together. In the second case we find the phosphate in large boulders, sometimes weighing several tons and intermixed with but relatively small proportions of any foreign substances. Apart from these two extremes, and from the original estuary-like formations in the permanent rock fissures, there were vast intervening spaces on the limestone bottom, sometimes embracing a great mileage, that were comparatively flat, or that had neither appreciable depressions nor elevations, and here the drift deposit was

necessarily comparatively light. Perhaps the following accidented line will approximately illustrate my meaning:



At 1 we should expect to find boulders.
" 2 " " " a very thin bed.
" 3 " " " a big pocket or great depth of bed.
" 4 " " " boulders again.
" 5 " " " a very thin bed or nothing.

I apply the word *bed* in this example to the mixture of phosphatic material only. Sometimes it is in the form of a very hard, compact white or yellowish colored rock; at other times it is in the shape of a friable, soft and plastic mass, more resembling kaolin or clay, and probably produced by a natural disintegration of the hard rock crust under the influence of concussion, rolling and attrition; and again it is a mixture of both these varieties, with clays, sands and flints.

The important feature in the Florida deposits of land phosphate, and, in my opinion, one to be most particularly brought to the notice of experts, is that, so far as I have seen and am able to judge, we have a formation consisting of

A. *Original pockets*, or filled-up cavities in the limestone.
B. *Mounds or beaches*, rolled up at the elevated points, and chiefly consisting of large boulder material.
C. *Surface drift*, covering immense areas, but of no exploitable value.

While the work of rough-and-ready exploration or prospecting may be said to have extended all over the State, and to have almost everywhere demonstrated the presence of land phosphates, their actual exploitation by proper mining methods has made but little progress, and is, in fact, at this moment still centralized in Marion and Citrus counties. The chief working mines are those at Dunellon and Blue Springs, in Marion County, and those of The Florida Rock Phosphate Co., in Citrus County, near Floral City, the two former being separated from the latter by the Withlacoochee River. It is from a very careful examination of the work done at these places, and of the aspects presented by the immense open cuts, that I have been induced to formulate my theory, and I may appeal to some facts for confirmation of my views.

In one of the quarries of the Dunellon Company (opened out at Dunellon by its able scientific director, Dr. C. U. Shepherd, of Charleston) we have a characteristic deposit of this phosphatic material. It has been proved, by actual experimental work, to extend with more or less regularity over an area of some 50 acres of land, and has shown itself to be a combination of the "original pocket" and the "mound" formation. The superincumbent material, principally sand and marls, has an average depth of about 10 feet, and the phosphate bed immediately underlies it. Sometimes it is in the form of enormous boulders of hard rock cemented together with clay, sometimes in that of the white plastic or friable substance already referred to. Its actual thickness has not yet been ascertained with certainty, but there are places in which I have seen it followed in depth for 30 feet in massive high-class phosphate. Directly outside the limits of the present workings (which I have placed roughly at 50 acres, but which may perhaps be slightly more or less), the "pockety" and "mound" formations come to an end and the bed thins out to an unimportant drift, which sometimes crops out at the surface and which has been followed for several miles in all directions without leading to another agglomeration of any industrial value.

In the main workings of the other two companies mentioned an exactly similar geological phenomenon has been noted, and I am therefore well warranted in declaring that in Florida we are called upon to deal with an essentially pockety, extremely capricious, uneven and deceptive formation.

Sometimes the pockets will be of enormous extent; will be worked in the form of quarries, and will undoubtedly, yield fabulous quantities of good phosphate of various grades. At other times they will be entirely superficial or will contain the phosphate in such a mixed condition as to render profitable exploitation impossible.

In this respect, as well as in many of its leading geological features, the Florida field bears a striking resemblance to some others with which I am acquainted, notably those of the Lot-Tarn and Garonne, Gard and Herault in southwestern France, and those of the Lahn in North Germany. There is no more certainty and no more continuity here than there, and I need scarcely add, under these circumstances, that none but experienced mining and chemical experts can hope to understand, or work the deposits, or estimate the value of the land in which they are situated.

Another excellent illustration, and one that may again be regarded as typical of this uncertainty, is afforded by one of my recent examinations in Taylor County, where the geological conditions do not differ in any salient features from those of the other counties, and where after the expenditure of much labor and care I was able to conclude as follows:

5,120 *Acres Phosphate Lands.*

A	B	C	D
E	F	G	H

Each square represents 640 *acres.*

Excellent phosphate indications are scattered more or less all over this tract, sometimes in the form of big boulders outcropping at the surface, sometimes in the form of small débris brought up from below by the mole or the gopher.

A systematic exploration was instituted and carried out, first with a 20-foot auger, then by sinking pits at short intervals to a depth of 15 to 20 feet. The result of the work was extremely interesting, and may be very briefly summarized:

A. No phosphate in workable quantities.
B. A large irregular basin or pocket of good phosphate covering an area of about 15 acres.
C. No phosphate in workable quantities.
D. No phosphate in workable quantities.
E. Large quantities on surface leading to immense pocket, covering about 35 acres. Very much mixed up material, principally phosphate of second grade.
F. No phosphate in workable quantities.
G. No phosphate in workable quantities.
H. The highest point on the tract, very densely grown, big boulders of phosphate and sandy conglomerate well distributed over surface; 15 small pockets of phosphate, principally boulders, *ending in coralline and amorphous limestone at an average depth of* 13 *feet.*

The total acreage of the phosphate deposit on this tract was 83 acres. The character, quantity and composition of the phosphate itself, as shown by the pits dug and by the material extracted from them, was estimated, after experiment, to be as follows:

Character and Importance of Phosphate Bed.

Boulder material, large and small, after screening	13	per cent. of the mass.
Débris and whitish phosphate, soft and plastic	29	" " "
Sand, clay, flints and waste	58	" " "
	100	

Average Analytical Value (after sun-drying).

	Boulders.	Débris, etc.
Phosphoric acid	36·00	27·50
Oxides of iron and alumina	5·25	9·00

These 5,120 acres were held under an option of purchase from local land agents or speculators, subject to expert's report. The price asked was $50 per acre for the tract, or say $3,085 *per acre of phosphate land.*

The thickness of the phosphate bed varied in different places from 3½ to 18 feet, but was found to have an average of about eight feet. Assuming that this thickness would yield say 5,000 tons to the acre, I reckoned on a probable total output of 415,000 tons, of which, according to the experiments summarized above, say 55,000 tons might be high grade boulder material, containing 80 per cent. bone phosphate, and 120,000 tons might be débris and second grades, containing, say, 61 per cent. bone phosphate, the remainder being waste.

On the basis of these calculations, and under my advice an offer was made for the property, but it was declined, and the option was accordingly allowed to lapse.

With regard now to the more

GENERAL ASPECT OF FLORIDA PHOSPHATES AND THEIR CHEMICAL COMPOSITION

I can only repeat that the concretionary masses of rock are generally embedded in a mixture of sand and clay, though very frequently the matrix is composed of very finely divided phosphatic débris. As would be expected in such a formation, the color, texture and specific gravity of the material are variable. In some regions perfectly white, in others it is yellowish or brown. A large proportion of it is very soft when damp, but becomes so hard when dried that it has been used by the natives ignorant of its other values as a building stone for their chimneys.

The following averages are selected with care from the results of several hundreds of complete analyses made either by myself or by my assistants in Ocala and New York. The samples in every case were taken from the exploratory pits in all the different counties, sun-dried, and marked, before leaving the ground, with full details of their origin.

They have been classed as

Boulder phosphate, meaning *clean, high-grade rock.*
Boulder and débris, " the unselected *phosphatic* material.
Soft white, " soft white phosphate in which no boulders are found.
Unselected, " everything that was thrown from the pits (phosphates and inert and waste matter).

I give the most important commercial details only.

	Phosphoric Acid.	Lime.	Iron and Alumina Oxides.	Insoluble Siliceous.	Carbonic Acid.	Fluorine.
Boulders (137 analyses)	34·15	42·10	6·32	5 20	1·80	1·70
" very carefully selected (86 analyses)	36·10	45·90	4·80	4·95	1 70	1·57
Boulder and débris (160 analyses)	29·70	38·20	9·42	13·25	2 10	1·49
Soft white (97 analyses)	32 50	41 70	8·70	5·20	4·80	1·15
Unselected total outcome (76 analyses)	13·80	27·40	18·65	31·00	3 16	0·37

PROPOSED METHOD OF WORKING THESE BEDS.

It will be self-evident from the preceding attempted description that several distinct and successive operations, some of them of extreme delicacy and importance, are needed before Florida phosphates can be placed upon the markets of the world in a proper form. So far as I can now foresee, these operations should be divided as follows:

FIRST.—Quarrying or excavating.

SECOND.—Washing the boulder or high grade material to free it from sand and other impurities.

THIRD.—Selecting the various qualities before removing them from the quarry.

FOURTH.—Kilning or calcining to free them from moisture or organic matter and to break up siliceous combinations.

In regard to actual quarrying and kilning, the difficulties to surmount are trivial, since negro labor is cheap and plentiful, and any amount of pine wood suitable for fuel is standing on the ground needing only to be felled. In regard to the washing, however, I foresee the greatest possible obstacles, owing to the scarcity of water—a scarcity so great that the sparsely scattered inhabitants are compelled to draw their supplies from small stagnant pools. Admitting, for the sake of argument, that in the majority of cases washing will be impracticable, it must necessarily follow that our chief reliance will be upon the rigorously careful selection by conscien-

tious and capable superintendents at the quarries. As little as possible of the clays and sands forming the matrix in which the phosphates are imbedded or with which they are so indiscriminately mixed up must find their way into the phosphate piles. This is, in fact, the point upon which I desire to lay most emphasis, and nothing but experience in actual work, guided by the results of daily chemical analysis, can be counted upon for the necessary education. The blocks of flint covered with a coating of phosphate may easily be mistaken for boulder small material; the clays may be easily mixed in with the soft white phosphates; and the phosphate itself, especially that kind classified as "soft white," is with difficulty distinguishable from the white carbonate of lime. Even the most accomplished expert, examining these beds for the first time and without a full knowledge of the variability of their composition, would be sure to go wrong and commit the most fatal blunders.

GENERAL REMARKS.

That there are in Florida some immense deposits of phosphatic material; that this material is of very varying grades of quality; that it is scattered all over the State, as well in the rivers as in the land, there can be no doubt. Of the river deposits I have said nothing, because I am not personally familiar with them, but of the land rock deposits the most important questions are: Where are the bonanzas? How are they to be found, and how, when found, are they to be profitably exploited?

The field may prove profitable to those who purchase and work the mines with judgment; it will certainly prove in the highest degree disastrous to such as allow themselves to be led away by the prevailing "boom" and to pay exaggerated prices for surface indications or anything but high grade material.

The first essential—the *sine qua non* preliminary—is a complete and exhaustive exploration of the land, section by section, by means of pits. The auger may serve some useful purposes at times, but my experience with it is unfavorable, and I therefore place no reliance upon its showings. This essential, systematic examination, renders equally necessary the giving of long options by sellers to serious intending buyers. To take up such short options as are now offered on lots of land in various counties at great distances from each other, under any conditions of price or surface indications, is simply suicidal, since they allow no time for efficient inspection. The country is wild and practically unsettled. Traveling in the interior is attended by the greatest difficulties and inconveniences. There are no wagon roads suitable for transportation purposes, for the horses sink everywhere knee-deep in sand. The railroad facilities, broadly speaking, are nearly nil, and the postal and telegraphic services are utterly inadequate. Under these circumstances (and I am rather understating than overstating facts), the control of a widely disseminated lot of workings carried on simultaneously would be impossible.

As to the question of quality and usefulness of these phosphates, I consider that the large number of my analyses of samples taken in all directions and under all kinds of conditions gives a satisfactory answer. It has been said that these phosphates are, to a great extent, combinations of phosphoric acid with alumina and iron, but I have shown that in the great majority of cases this is really a misapprehension. On the whole, their average richness is less than we were led to expect, and the proportion of really high grades is extremely small. While I can see no present outlet of importance for the second class matter, the rich boulder material compares favorably with many others much appreciated by manufacturers of superphosphate. If they are properly selected before shipment, I can therefore foresee no possible objection to the high grades, and I believe they will find a ready market at European ports directly their composition is fully understood.

THE NEW DEEP WATER PROJECT AT CORPUS CHRISTI, TEXAS.

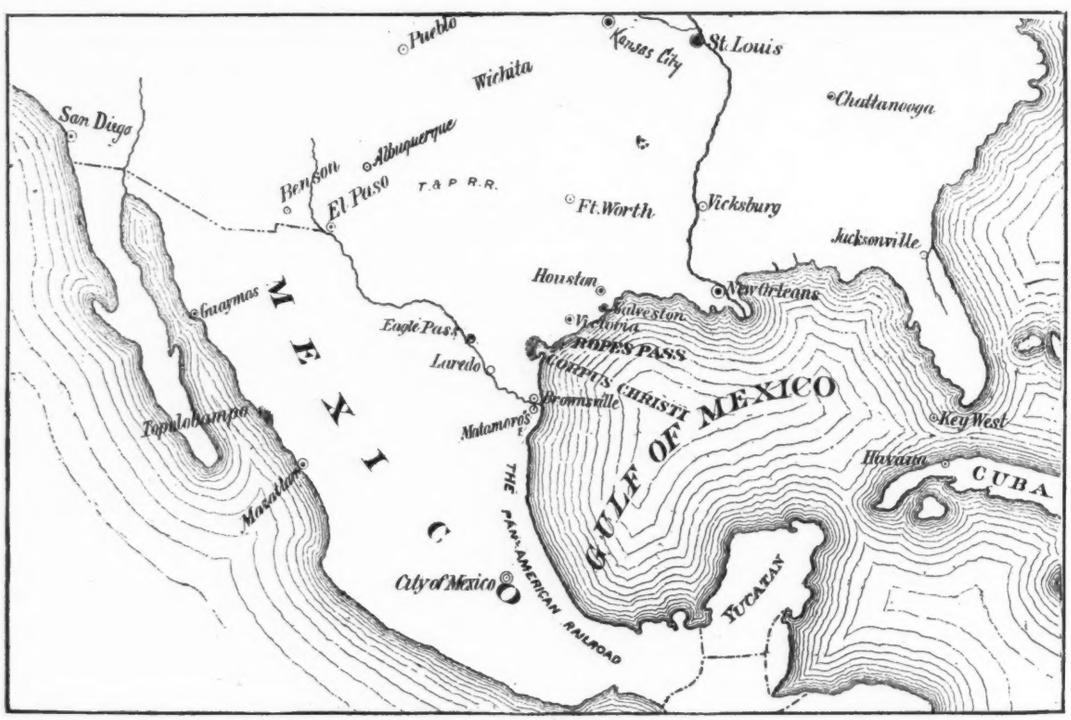
Written for the Engineering and Mining Journal by William Kent, M. E.

In the spring of 1889 the writer had an opportunity to visit the city of Corpus Christi, in the southern part of Texas, and then became familiar with the excitement prevailing throughout the whole State as well as in adjoining States as to the question of obtaining a deep water harbor at one or more points on the Texas coast. So great appears the necessity for such a harbor that two great interstate conventions have been held, one at Denver in 1888, and one at Topeka in 1889, at which 19 States were represented by hundreds of delegates, for the purpose of influencing public opinion and memorializing Congress to do something to give a deep water outlet to all the Southwest country.

A glance at the map of the United States will show what a vast extent of country, both in the United States and Mexico, would be tributary to a deep water seaport established on the Texan coast.

The government has in past years spent a great deal of money in attempting to improve the harbor of Galveston, but the difficulties of the work were underestimated, not enough money was spent and much work that was done has been undone by natural causes, such as the action of the teredo and of the Gulf currents. Galveston is now making great efforts to secure a large appropriation to continue and complete the formation of a deep water outlet to the Gulf, but as the amount required is estimated at over $5,000,000 there is but small chance of the passage of the bill. Full discussions of the difficulties encountered at Galveston may be found in reports of the United States engineers.

Corpus Christi was a candidate with Galveston for a slice of the Government appropriation, but having a population of only about 5,000 against Galveston's 40,000, her influence was not sufficient to obtain it. Private enterprise has, therefore, undertaken to solve the deep-water problem at this point.



TERRITORY TRIBUTARY TO GULF PORTS.

In the year 1888 Col. E. H. Ropes, of New York City, while visiting Corpus Christi became impressed with the advantages which that point offered as a future deep-water seaport, and associating himself with a few others undertook the formation of a company to obtain control of land in the vicinity of the city, and franchises for establishing docks, building railroads, etc. From that time to the present he has been busily engaged with the project, and he has begun an engineering work of magnitude which, if successful, will make an entrance for deep-water vessels from the Gulf of Mexico, and insure the building of a great city on Corpus Christi Bay.

Referring to the outline map of a portion of the United States, herewith presented, the first matter worthy of attention is the commanding geographical position of Corpus Christi with reference to the Gulf of Mexico and to the territory lying north, west and southwest. It is in the bend of the coast line, at the most western point of the eastern and southern coast line of the United States. For all the country referred to, therefore, it is the strategic position for export and import trade, giving the advantage of a shorter railroad haul than any other port. As compared with Atlantic ports Colonel Ropes says in one of his pamphlets:

"It is the future deep-harbor for a larger extent of territory and a larger population than are now tributary to any one sea-port in the world. It is 800 miles nearer Denver, 500 miles nearer Kansas City, 250 miles nearer St. Louis, 400 miles nearer Omaha, 1,000 miles nearer Santa Fe, and many hundred miles nearer the heart of the Northwest than any Atlantic port is.

"The area of territory tributary to a west Gulf port is greater than

that which is tributary to any other section of coast in the United States. Eminent authorities give the following figures:

Atlantic Coast	550,000	square miles area.
Great Lake Basin	500,000	" " "
Mississippi River Basin	300,090	" " "
Pacific Slope	700,000	" " "
West-Gulf Basin	1,000,000	" " "

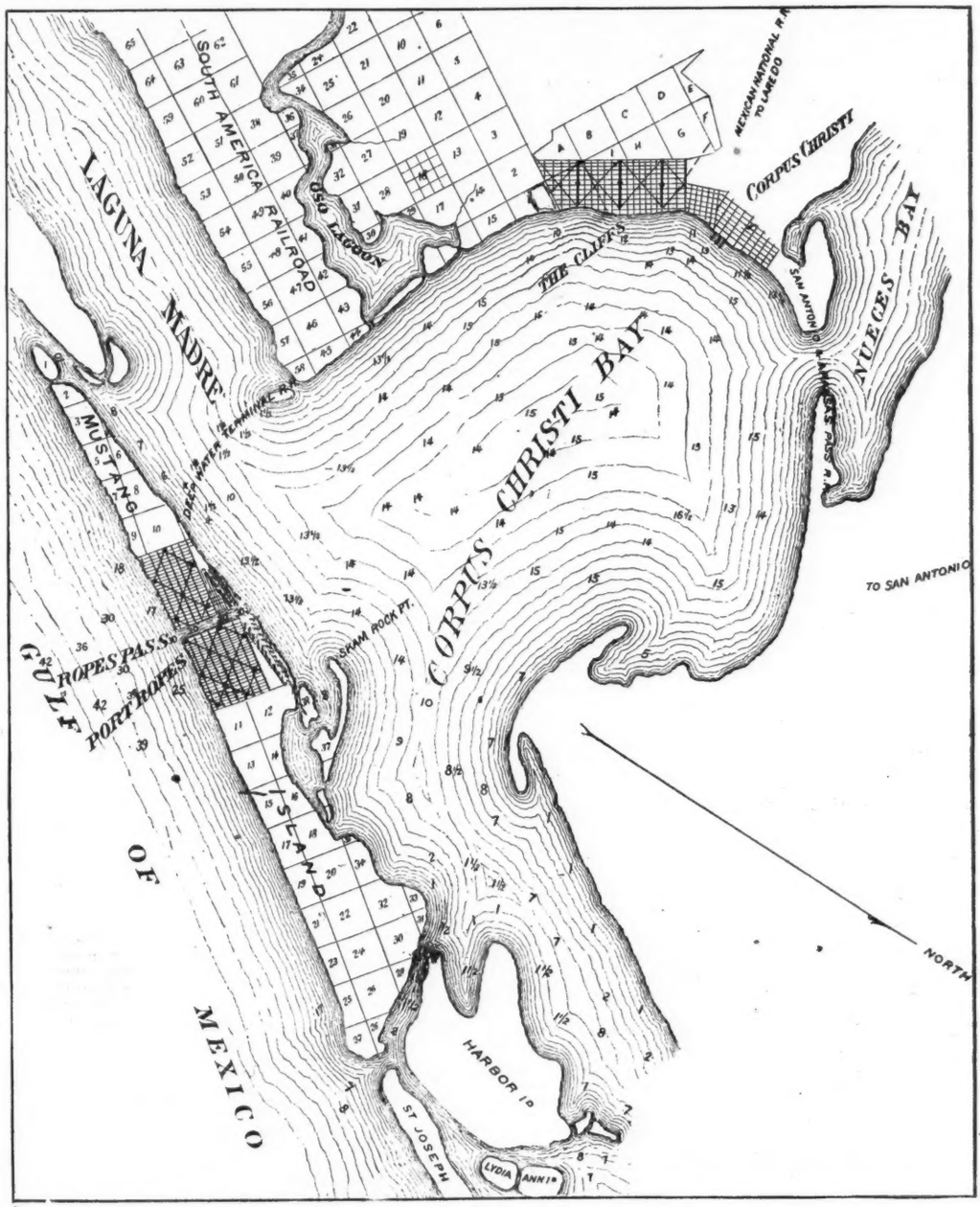
"In each of these basins the great problem is how to reach the water base with the least railway haul."

Leaving to the imagination of readers what might further be said in regard to the geographical position of Corpus Christi, and the real estate and other "booms" now in progress there, what interests us most is how Col. Ropes and his associates intend to get deep water.

Nature had made them as an outlet, they choke up more and more until some great storm comes, which breaks out a deep pass again directly in front of the bay, where the pass had been once before. Then the new pass begins again its slow march to the south, history again repeating itself.

Aransas Pass, the present entrance to Corpus Christi, has thus been moving southward for years. To prevent its further progress, the government has been engaged in placing a stone revetement on the northern end of Mustang Island, but it is slow work, and after it is completed there remains the construction of a channel through the bay to Corpus Christi. The present channel, a narrow and tortuous one, extends around the east, north and west sides of Harbor Island.

Colonel Ropes, in studying the question of the movement of the passes,



CORPUS CHRISTI BAY AND ROPES PASS.

Referring to the map of Corpus Christi Bay, it is seen that between the bay and the Gulf of Mexico there is a narrow island, called Mustang Island, which is about twenty miles long. At the northern end of this island is Aransas Pass, separating it from St. Joseph's Island. This pass has 30 feet of water in its main channel, but there is only 8 feet over the bar, which limits the draught of vessels which can now go to Corpus Christi. At the southern end is Corpus Christi pass, now very shallow and of no importance.

It is a peculiarity of all the passes on the Gulf of Mexico that they tend to move to the southward, by cutting away the north end of the islands adjoining them and building up the south end. General McClellan, when captain of engineers in 1853, drew the attention of the government to this fact. After they have worked themselves south of the bays for which

came to the conclusion that probably the time is not distant when nature would repeat herself and break out a new deep pass opposite the center of Corpus Christi Bay.

He resolved to anticipate nature, and cut the new pass himself. His engineers examined the ground and the bay carefully in order to locate the new pass where the old channel of the Corpus Christi pass once had been, and where, therefore, the deepest channel could in future be maintained. That spot was found directly opposite the deepest water in Corpus Christi Bay. It was also where the lowest points of land are found on Mustang Island, and also where deep water in the Gulf comes nearest the shore.

The map of Corpus Christi Bay shows clearly where the new pass, to be called Ropes Pass, is laid out. Work has been commenced on it, and

a steam dredge has been at work cutting a channel through the island, night and day for the past two months.

The advantages claimed for Ropes Pass over Aransas Pass are best described in the words of Col. Ropes himself:

"It is essential to success that there should be a free outlet for the passage of water from the Gulf to the Bay and back again with each tide. The passage from Ropes Pass is so much freer from obstruction and the tidal basin within is so much larger, broader, deeper and better located for free movement of the water as to insure that the volume of water entering during a tide will be many times larger than that which can enter through Aransas Pass.

"Since the scouring of a deep channel in the Gulf must be done by the currents, it is of the greatest importance that the volume of water admitted and discharged with each tide should be as large as possible. A study of the map will show that when the water from the Gulf has once emerged from the inner end of Ropes Pass, it encounters no further resistance, but can freely spread at will over a broad expanse of deep water.

"At Aransas Pass these conditions are totally different; there, when the waters have passsed through the mouth of the Pass, they strike Harbor Island, lying directly across their course, and are checked and forced up Aransas Harbor three miles, at a right angle to their first course. This greatly impedes and diminishes the *force* and *velocity* of the current. Three miles up the Harbor their way is again impeded by the Lydia Ann Islands, which split the current in two, after which it passes in large part over shoals before entering Aransas Bay. That Bay is long and narrow comparatively, and lies with its narrow end towards Aransas Pass. All of these conditions compare unfavorably with those presented by Corpus Christi Bay, and diminish the volume of water which *would* enter through the Pass if it had no obstruction during and after entering.

"Again, the wide part of Corpus Christi Bay, and the deep part also, lie directly against Ropes Pass, so that when the tide falls the waters are close by, ready to discharge themselves in large volume into the Gulf. At Aransas Pass, as has been stated, the great body of water has a longer distance to travel, and consequently looses in both volume and velocity.

"Again, Corpus Christi Bay is several feet deeper than Aransas Bay, and this also has a great influence on the free admission of the tides.

"While Aransas Pass, therefore, is better for improvement than any existing pass, yet it does not offer any such encouragement to engineering operations as would be offered by a pass opening directly into the large, broad, deep bay of Corpus Christi, which bay is admitted by all authorities to be the best tidal basin upon the entire coast.

"Whatever may be hoped, therefore, from any engineering operations at Aransas Pass, we may confidently expect much better and greater results from the same operations at Ropes Pass. If a jetty at Aransas Pass will produce a given result, the same jetty at Ropes Pass will certainly produce a much greater one, because it will have a larger volume of water acting with it."

The distance across the Mustang Island at Ropes Pass is about two miles. It is intended to ultimately make the cut 1,000 feet wide, and to place a revetement upon the southern bank of it to prevent the bank moving southward. A jetty also is projected to be run out into the Gulf from one or both banks.

Mustang Island differs from most of the islands along the Gulf coast in being composed of high cliffs and banks reaching forty or fifty feet above the level of the Gulf. It is, therefore, high and dry above storm tides. Advantage is to be taken of this fact to locate the deep-water docks in the pass itself, instead of at the city of Corpus Christi, twenty miles distant. A terminal railroad will be built from the city to the docks. At the point where it crosses from the main land to the island the water in Laguna Madre, shown on the map, is only 1½ feet deep, so that the railroad presents no engineering difficulty.

Corpus Christi is now the terminus of two railroads, the San Antonio & Aransas Pass, leading to the northwest, and the Mexican Central, leading westward to Laredo, and thence to the City of Mexico. It is the terminus also of the Corpus Christi & South America railroad, which is now under construction from Corpus Christi to Brownsville, 150 miles due south on the Mexican border. Railroads are also projected westward to Eagle Pass, Texas, to connect with the Southern Pacific, and to Topolobampo, Mexico, on the Gulf of California. When deep water is secured through Ropes Pass, and proper dock facilities are provided, these railroads will all be connected by means of the Terminal railroad with Port Ropes, which will then become an important seaport, Corpus Christi and "The Cliffs" adjoining it remaining as the most desirable places for residence and general business.

The boldness of the project of Col. Ropes in cutting through two miles of island, and neglecting Aransas Pass, will command the attention of all engineers interested in harbor improvements. Should he succeed in it, the future city of Port Ropes will be a grand monument to his sagacity and enterprise.

GEMS AND PRECIOUS STONES.

The Brooklyn *Times*, in its issue of 16th inst., says: "A sumptuously artistic volume has been issued by the Scientific Publishing Company, New York. "Gems and Precious Stones of North America" is an ably written work by George Frederick Kunz, gem expert with Tiffany & Co., special agent of the United States Geological Survey and of the Eleventh United States Census, member of the Mineralogical Society of Great Britain and Ireland and other similar bodies on the Continent. The volume presents a popular description of the occurrence, value, history and archæology of North American precious stones, and of the collections in which they exist, also a chapter on pearls and on remarkable foreign gems owned in the United States.

The opening chapter is on diamonds, and the fifteen succeeding chapters discuss in succession all the gems from the sapphire to the fossil coral. The main body of the illustrations are in the form of unusually handsome and accurate colored plates from the lithographic presses of L. Prang & Co. These plates are probably the finest that have ever been printed. The work as a whole is worthy of the highest admiration. Mr. Kunz displays not only a wonderful knowledge, but a most happy gift of presentation, and every connoisseur will wish to have this book in his library."

School of Mines Quarterly, in its issue of July, says:

GEMS AND PRECIOUS STONES OF NORTH AMERICA. By George Frederick Kunz. (Royal 8vo, pp. 336, New York. The Scientific Publishing Company. $10.)

Mr. Kunz has been for years the gem expert with Messrs. Tiffany & Co., is well known as a collector of minerals and has described many new localities. He has had great opportunities, and may speak with authority upon all statistics of locality, production and commercial value of gems and ornamental stones.

The work just issued is appropriately called a "popular description," as it is in a large measure a history of famous American gems, their discovery, value, present and former owners, brief general descriptions of the species and special chapters upon pearls, aboriginal lapidaries and famous foreign gems now in this country.

The value to the mineralogist is the bringing together of accurate records of the many American localities, the production and value of the stones found in each locality, the methods of mining and search, and the references to the literature of the subject.

The book is very handsomely illustrated. Especially noticeable are the colored plates, which are excellent reproductions of color and form.

Indian Engineering, in its issue of 12th ult., says:

THE GEMS AND PRECIOUS STONES OF NORTH AMERICA. By George Frederick Kunz, Gem Expert. New York, 1890.

We are indebted to the "New York Scientific Publishing Company" for placing another great and beautifully illustrated work before the world in the above named highly comprehensive large volume. By geologists and mineralogists this unique edition of gem and precious stones lore will be hailed as a valuable contribution to both literature and science in the special domain to which it belongs. Even to the casual reader and admirer of beautiful gems, the wealth of interesting matter contained in its pages must prove an intellectual treat, while to collectors of gem specimens and traders in precious stones, it will be found worthy of close study; and will, doubtless, evoke the expression of admiration of every one to whom the privilege of inspection may be accorded.

Whether we consider the extreme beauty of the colored plates which embellish the work and present to the eye, in their natural colors, facsimiles of the gems, exquisitely delineated, or the descriptive letter-press which treats so fully of their occurrence and history, we are compelled to express our unfeigned congratulations for the exhibition of both mental talent and artistic skill on the part of our fellow-laborers in America, in producing a volume so worthy of occupying a prominent place on our shelves as a supplement to Dana's great work on the general principles of mineralogy. Our own copy lies on our office table and we invite its inspection by such of our readers as may be interested in the special subject on which it treats.

THE METALLURGY OF STEEL.

American Machinist, in its issue of 21st inst., says:

"THE METALLURGY OF STEEL. By Henry Marion Howe, A. M. (Harvard), S. B. Vol. I.

This work is one of great value to engineers and others who wish to become acquainted with the different processes of manufacturing, and the chemical, physical, and mechanical conditions which affect the properties of iron and steel. The subject is one of great magnitude; it has been handled in a masterly manner, and the whole work shows that an immense amount of labor, research, thought, and literary skill has been expended on it. Space will not permit us to dwell on the details of this work, but to give an idea of the labor and patience expended we shall simply refer to one of the many instructive diagrams which the book contains. This diagram shows in a graphic way the effect of carbon on the tensile strength of iron, and in it are plotted 1,500 tests which were gathered from many sources. The book also contains 222 tables, many of which required a great amount of calculation; and throughout the 373 pages of reading matter 228 illustrations are interspersed. The author also presents a complete review of all important conclusions reached by earlier investigators, and his masterly discussion of them will be appreciated by all interested in the subject. The work is one of great merit, and is a notable contribution to the literature of iron and steel metallurgy. The book is published by the Scientific Publishing Company, 27 Park place, New York, Price, $10."

American Manufacturer, in its issue of August 1st, says:

"We recently had occasion to call attention editorially to the need of a new and complete work on the metallurgy of iron and steel, the work named above not yet having come to our notice, and in our remarks spoke briefly of the difficulties in the preparation of such a work, at the same time expressing a desire to have such a work undertaken. Since then the above from the able pen of Henry M. Howe has appeared, and well it fills a much needed place in the literature on this important subject.

A competent writer in this line of work must possess a combination of attainments rarely found in one individual, namely, an extended and thorough knowledge of the topic immediately in hand, and of the sciences upon which it is based, both theoretically and practically, a degree of literary ability and a proficiency in the languages of continental Europe enabling him to command the information at hand in the published technical works in those languages, and the keenness and breadth of mind to properly carry out the discussion of the many difficult questions which come up in a thorough treatment of this broad subject. This combination of talents, rare though it is, we believe is possessed by Mr. Howe in a remarkable degree, as a careful examination of this work will prove.

The work is substantially a reprint of a series of papers by the author in the ENGINEERING AND MINING JOURNAL, and which have attracted the attention of all interested in metallurgy [here an abstract follows]. The style in which the book is written is clear and vigorous, and while some may criticise it from the occasional vein of levity in which the author writes on such a subject, yet these faults, if faults they really are, cannot be considered serious, and judged as it may be, stands as a most valuable addition to literature on this subject, and one which entitles its author to a place with the few great metallurgical writers of the world."

PITTING OF BOILER PLATES.

Mr. T. P. Bruce Warren has communicated to the *Chemical News* som observations on the corrosion of boiler plates, which also bear upon other similar structures of sheet or plate iron. It is well known, as Mr. Warren remarks, that a rolled iron plate has a skin or surface which resists oxidation. If this skin is removed by scratching or filing, the new surface rusts rapidly on exposure to damp air. If a freshly rolled plate is cut, the surface remains intact, while the edges rust in a very short time. If the iron is immersed in diluted acid, the skin-coated surface resists the action more or less, while the cut edges are rapidly attacked. This difference Mr. Warren ascribes to the altered electrical relations of the surface—one being more electro-positive than the other. Pitting of plates can be explained in the same way. The only remedy is the entire removal of the surface of the plate after rolling, which would result in the presentation of a uniform surface less likely to promote local chemieal action. Care must be taken to keep the boiler in an electro-negative condition, which is done by suspending inside it, in a manner to preserve perfect metallic contact, a lump or plate of zinc. Whenever a boiler so fitted is cleaned, and the zinc put back, the perfection of the metallic contact must be carefully seen to. If an impure zinc is used, the surface dissolves, leaving a preponderance of lead, which puts the iron of the boiler into an electro-positive condition, and corrosion ensues.

The German Government and the Miners.—It is officially announced that all, or nearly all, the demands which were recently submitted to the German Government by the miners' delegates have been conceded. The principal points are that shifts last eight hours only, that all the miners who were dismissed after the recent strikes shall be reinstated, and that provision shall be made in the Labor Amendment Bill, now before the Reichstag, for the creation of arbitration courts. The mining officials are also to come under the jurisdiction of the court of discipline, and they are to be punished for ill-treating miners. "Farming" certain jobs is also to be abolished.

Iron as a Filtering Material.—A process of manufacture of filtering material is described as consisting essentially in reducing ferric oxide by heating it in contact with gaseous fuel. Small pieces of iron ore, preferably hematite, are packed into a retort heated externally, preferably by producer gas. When the charge is at a cherry red heat gaseous fuel is admitted into the retort and brought into thorough contact with the ore. At the end of four or five hours, if the exit gas be inflammable, the process is finished, and the charge raked out and allowed to cool. Ordinary coal gas or other gaseous fuel may be used instead of producer gas. The magnetic oxide so produced is available for filtering water, sewage, sugar syrups, alcoholic liquors, etc.

The Basic Process in Germany.—Some interesting figures relating to the progress in Germany have been lately compiled by Herr Kintzle in a paper read before the Aix-la-Chapelle section of the Society of German Engineers. For a series of years the product was as follows in metric tons:

Year.	Puddled iron.	Total steel.	Basic steel.	Acid steel.
1883	1,517,410	1,060,592	260,000	860,000
1884	1,502,961	1,138,499		
1885	1,504,072	1,202,090	406.000	742,000
1886	1,414,611	1,376,356	700,000	676,000
1887	1,624,978	1,738,404	900,000	838,000
1888	1,644,142	1,862,676	1,020,000	842,000
1889	1,650 427	2,046,000	1,200,000	846,000

There are now running in Germany 14 works with 50 converters on basic steel, only three of which partially employ the acid method. Only three steel works with eight or ten converters use the acid process exclusively.

The Nicaragua Canal.—The news comes from San Francisco that the Nicaragua Canal Construction Company has purchased from the American Contract and Dredging Company the entire plant formerly used on the Panama Canal. The purchase includes seven dredges, fifteen lighters, several tugboats, the machine shops, with their contents and supplies of every kind. The plant is now in preparation for removal to San Juan del Norte. It did most of the work accomplished on the Panama Canal. The dredges are of exceptional power, and one of them has a record of excavating 257,000 cubic meters in one month. The price paid was $600,000. Captains Clapp and Morton, who left New York August 1st for Aspinwall, went there for the purpose of taking the dredges to Greytown. The canal company has contracted with William Simons & Co., of Renfrew, Scotland, for one of their patent hopper dredges, which has three central hoppers holding 1,000 tons, with a capacity of 500 tons an hour. It has two triple expansion engines of 1,500 horse power, three boilers, working under 150 pounds pressure. These dredges will be employed on the bars at Brito and Greytown. The same advices report the opening of the old harbor at the latter place. It is reported from Washington that a bill has been introduced into Congress to repeal the charter granted the Maritime Ship Canal Company of Nicaragua. It was done at the instance of Mr. A. L. Blankman, president of the American, Atlantic and Pacific Ship Canal Company, who gives his reasons as follows:

"I am acting solely in the interests of my company, a corporation organized under the laws of Nicaragua, and is composed of citizens of the United States. The original, exclusive right to construct a ship canal across Nicaragua, between the Atlantic and Pacific, was made to Cornelius Vanderbilt, Joseph L. White, Nathaniel H. Wolf and others, their associates. The charter was obtained in 1886, and was for a term of 85 years.

"Great improvements were made and large sums of money expended. The Maritime Ship Canal Company is trying to seize our property in Nicaragua."

He declared further that the company was willing to do the work and so informed the Nicaraguan government in 1887, but an agent of the Maritime company was engaged in negotiations for the charter at the time and the government had declared the concessions granted his company invalid. They were ready now when the government permitted them to go ahead with the work. All these statements are embodied in the bill introduced in Congress.

There is no probability that the bill will be reported favorably by the committee of Congress. The rival company has apparently no claim on the United States Government, and should seek for its rights, if it has any, from the government of Nicaragua.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office:

TUESDAY, JULY 29th, 1890.

432,977. Hoisting and Conveying Apparatus. Franklin L. Chamberlin, Cleveland, O.
432,984. Pulverizing Machine. Franklin D. Cummer, Cleveland, O.
433,002. Hoisting Machine. John E. Hensley, Allendale, Ill.
433,008. Lubricator. Frederich W. Krantz, Detroit, Mich., Assignor to the Michigan Lubricator Company, same place.
433,073. Dumping Car. George W. Dickinson, Butte City, Mont.
433,084. Protractor. Duane J. Kelsey, New Haven, Conn.
433,086. Process of Deoxidizing Copper. William W. Keys, Bridgeport, Conn.
433,104. Feed Water Heater and Purifier. Adrian R. Smith, San Francisco, Cal.
433,127. Air Brake. Thomas J. Hogan, Pittsburg, Pa., Assignor to the Westinghouse Air Brake Company, same place.
433,129. Process of Manufacturing and in the Composition of Refractory Cements, William S. Lea, Hanley, County of Stafford, England.
433,135. Apparatus for Decomposing Metallic Salts. Orrin B. Peck, Chicago, Ill., Assignor to Melinda Peck, same place.
433,136. Method of Handling and Delivering Slag. Orrin B. Peck, Chicago, Ill., Assignor to Melinda Peck, same place.
433,137. Contrifugal Plant for Treating Slag. Orrin B. Peck, Chicago, Ill., Assignor to Melinda Peck, same place.
433,138. Apparatus for Treating Slag. Orrin B. Peck, Chicago, Ill., Assignor to Melinda Peck, same place.
433,139, 433,140, 433,141, 433,142, 433,144, 433,145. Apparatus for Centrifugally Treating Molten Material. Orrin B. Peck, Chicago, Ill., Assignor to Melinda Peck, same place.
433,163. Grinding and Amalgamating Mill. Middleton Crawford, Liverpool, England.
433,164. Compound Engine. Francis W. Dean, Cambridge, Mass.
433,165. Water Current Motor. George R. Driggs, San Francisco, Cal.
433,181. System of Electrical Transportation. Albert L. Parcelle, Boston, Mass., Assignor to the Florence Motor Company of Maine.
433,213. Insulating Compound. Israel Rabinowicz. Schenectady, N. Y., Assignor of two-thirds to Charles Strattmann and J. Teller Schoolcraft, same place.
433,267. Tubular Lantern. Alfred L. Barron, Tiffin, Ohio.
433,273. Railroad Rail Joint. Charles S. Churchill, Roanoke, Va.
433,279. Apparatus for Subaqueous Excavations. Adoniram Fairchild, New York, N. Y.
433,301. Journal Brass. William McCombie, Chicago, Ill.
433,314. Railroad Joint. Harlow D. Avera, Rocky Mount, N. C.
433,336. Apparatus for Oxygenating and Carbureting Air. Charles Fiesse, New York, N. Y.
433,357. Car Coupling. George M. Murr, Concord, N. C.
433,378. Journal Bearing. Peter Sweeney, New York, N. Y., Assignor of one-half to Charles H. Boyer, same place.
433,394. Power Transmitting Mechanism. Warren S. Belding, Chicago, Ill.
433,404. Car Axle Lubricator. Henry M. Goodman, Louisville, Ky., Assignor of one-third to F. A. Baker and J. S. Bell, same place.
433,415. Water Tube Steam Boiler. Harry H. Lindemuth, Mount Joy, Pa., Assignor of one-half to Peter L. Kreiss, same place.
433,416. Rolling Mill Gearing. George W. Marble, Plymouth, Ind., Assignor of one-fourth to Millard W. Simons, same place.

TUESDAY, AUGUST 5TH, 1890.

433,453. Car Coupling. George H. Dougall, Sr., New Orleans, La.
433,470. Boiler or Pipe Covering. Henry W. Johns, New York, N. Y.
433,471, 433,472, 433,473. Non-Conducting Covering. Henry W. Johns, New York, N.Y.
433,481. Grip for Hoisting Machines. Luther E. Mansfield, Brooklyn, N. Y.
433,487. Car Coupling. Theodore F. Phillips, Wabash, Ind.
433,491. Furnace Grate. Richard S. Richards, London, England.
433,524. Railroad Tie. Thomas W. Gilmer, Big Stone Gap, Va., Assignor of two-thirds to Thomas H. Walker and Henry Webb, same place.
433,525. Journal Box. Benjamin F. James, Springfield, Mass.
433,534. Apparatus for Washing the Fumes of Sulphur. Thomas W. Montgomery and John Warnke, New Orleans, La.
433,544. Electric Railway. Abraham A. Shobe and William Embley, Jerseyville, Ill.
433,551. Car Engine. Elmer A. Sperry, Chicago, Ill.
433,556. Grip Coal Drilling Machine. Edgar Wages and Samuel H. Armstrong, Canton, Ill.
433,563. Combined Gas and Steam Motor Engine. Herman Haedicke, Remscheid, Germany.
433,571. Rail Joint. August Klein, Chicago, Ill.
433,576. Boiler Feeder. Joseph E. Marcy and Henry A. Jones, New York, N. Y.
433,580. Machine for Making Tubing. William Probert, Duncansville, Pa.
433,591. Welding Seams of Pipes. Mildred Blakey, Pittsburg, Pa.
433,594, 433,595. Air Brake. Thomas J. Hogan, Pittsburg, Pa., Assignor to the Westinghouse Air Brake Company, same place.
433,603, 433,604. Regenerative Furnace. Samuel R. Smythe, Allegheny, Pa.
433,610, 433,612. Mining Machine. Foree Bain, Chicago, Ill.
433,616. Bridge Rail Joint. Roswell H. Buckingham, Chicago, Ill.
433,641. Direct Acting Engine. Albert Ball, Claremont, N. H., Assignor to the Sullivan Machine Company, same place.
433,651. Railroad Tie. Frederick F. Field and John Driscoll, Providence, R. I.
433,653. Lump Fuel of coal, charcoal, or coke screenings. Adolph Mayer, Chicago, Ill.
433,660. Speed Regulator for pulleys. William S. Sims, Pittsburg, Pa.
433,670. Ore Mill. Irving L. Cark and James B. Paterson, San Diego, Cal., said Paterson Assignor to Alfred E. Cowles, same place.
433,671. Electric Soldering Iron. Charles E. Carpenter, Minneapolis, Minn., Assignor to the Carpenter-Nevens Electro-Heating Company, same place.
433,697. Instrument for Surveying and Grading Ditches. Edward Reichenbach, Orrville, Ohio
433,714. Ore Samples. Henry L. Bridgman, Blue Island, Ill.
433,727. Rotary Engine or water wheel. Samuel B. Guff, Camden, N. J.
433,737. Air Brake. William E. Maher, Johnson City, Tenn., Assignor of one-half to William Toothe, New York, N. Y.
433,752. Hoisting Apparatus. Jerome B. Sweetland, Pontiac, Mich.
433,777. Bituminous Coal Breaker. William H. Emerson and John Skinner, Dunfermline, Ill.
433,778. Railroad Tie and means for securing rails to the same. John M. Fellows, Burlington, Ind.
433,779. Shaft Hanger. John W. Fisher and Watson A. Kinney, Bridgetown, Nova Scotia, Canada.
433,784. Process of and Apparatus for Manufacturing Heating and Illuminating Gas. Charles F. Hadley, Allegheny, Assignor to the United States Fuel Gas Company, Limited, Pittsburg, Pa.
433,797. Car Coupling. Aaron Lougheed, Port Arthur, Ontario, Canada.
433,798. Car Coupling. Henry Marshal, Lincoln, Neb.
433,802. Apparatus for the Manufacture of Gas. Kerr M. Mitchell, St. Joseph, Assignor of one-half to John Dell, St. Louis, Mo.
433,805. Hoisting and Conveying Machine. Ezra Nicholson, Cleveland, O.
433,806, 443,807. Motor Engine Worked by Oil Vapor. Nicolaus A. Otto, Cologne, Assignor to the Gas-Motoren-Fabrik-Deutz, Koln-Deutz, Germany.
433,808. Apparatus for Governing Gas or Petroleum Motor Engines. Nicolaus A. Otto, Cologne, Assignor to the Gas-Motoren-Fabrik-Deutz, Koln-Deutz, Germany.
433,850. Apparatus for Concentrating and Amalgamating Ores. Oren Campbell, Lawrence, Mass.
433,870. Combined Oil and Water Vaporizer and Burner. Frank B. Meyers, Fort Plain, N. Y.
433,871. Hydrocarbon Burner. Frank B. Meyers, Fort Plain, N. Y.
433,875. Chair Sleeper for Railways. Wybrants G. Olpherts, London, England.
433,881. Mining Machine. Noah S. Amstutz, Cleveland, O., Assignor to himself, C. W. Foote, and F. C. Goff, same place.
433,893. Insulating Material. John Fottrell, Philadelphia, Pa.
433,926. Apparatus for the manufacture of gas. John B. Archer, Washington, D. C.

PERSONAL.

Mr. H. M. Cooke, the well-known mining stock broker, has returned from a summer trip to San Francisco.

Dr. Alexander Trippel is superintending the putting in of a 30-ton smelter on the Buffalo mine near Globe, Ariz.

Dr. E. D. Peters, accompanied by Charles T. Gooding, left for Silver Bell mining district, Arizona, to investigate some copper mines there.

OBITUARY.

Thaddeus W. Spring, a well-known pioneer of California, died in San Francisco on the 12th inst. The deceased went to the Pacific Coast in 1850, with General McGruder, and, on his discharge from the army, went to the mines. He afterward established himself in business in San Francisco.

William H. Hall, a prominent hardware man of Kansas City, Mo., died August 1st, in his 59th year. He was born in New York, and in 1856 went into the hardware business in Wheeling, W. Va. In 1881 he went to Kansas City. Mr. Hall was considered the best informed hardware man in the West.

S. P. Bennett, of Grand Rapids, Mich., died at Colorado Springs, Colo., on the 5th inst. He was a stockholder in the Edison Electric Light Company, the Chapman Coal Company, of Jackson, O., and was also a member of the Western Coal Dealers' Association, an organization which he helped to call into existence, and of which he was a director for two years.

B. B. Martin, of Pittsburg, Pa., died on the 4th inst. Mr. Martin was at one time the principal member of the firm of Martin & Co., whose properties cover thousands of acres of the best bituminous coal lands of Cambria County, Pennsylvania, and at the time of his death was the owner of thousands of acres of coal and timber lands in Clinton and Center counties. He was 69 years of age.

Mr. Reuben Miller, one of the most prominent pioneers of the Pittsburg iron trade, died in Allegheny on the 13th inst. Mr. Miller was born near Frankford, Pa., in 1805, but at the age of 13 he came to Pittsburg with his father, who was then in the iron business. In 1836, he with several partners commenced and successfully carried on a foundry on the Southside. In 1839 this firm built the "Valley Forge," the first and only iron boat that ever navigated the Western Rivers.

Mr. Jephtha H. Wade, one of the pioneer telegraphers of America, died at his residence in Cleveland on Saturday, August 9th. About the year 1848, in connection with Mr. J. J. Speer, Jr., he built part of the old "Erie and Michigan" telegraph line from Detroit to Jackson.

In 1855 the Erie & Michigan Company and the New York & Mississippi Valley Printing Telegraph Company were united under the name of the Western Union Telegraph Company, with a capital of $500,000. This was the origin of the corporation which has maintained control of the telegraph business in this country ever since. Mr. Wade was the active agent of the consolidated company. When, in 1861, the Pacific Telegraph Company was incorporated, principally by directors of the Western Union, Mr. Wade was made president. In 1864 the company was merged into the Western Union, and in 1866 Mr. Wade was unanimously elected president of the latter company. In 1867, on account of ill health, he declined a re-election. Mr. Wade made a vast fortune out of the telegraph. He was president and director in several banking, railroad and manufacturing enterprises in Cleveland, and at his death was one of the most prominent men of that city. Mr. Wade was born in Seneca County, New York, and was 79 years of age at his death.

INDUSTRIAL NOTES.

It is stated that the Lawrence Iron Works, of Ironton, O., will move its rolling mill to Glasgow, Va.

A $300,000 stock company, it is stated, has been organized to establish boiler and machine works at Buena Vista, Va.

The Columbus and Hocking Coal and Iron Company's Gore furnace is being dismantled. At present there is no intention of rebuilding.

The Etna Iron Works, at Etna, Ga., have shut down for repairs. A new hot blast will be added and a new hearth front put in the furnace.

Little Friend Mining Company, East St. Louis; to operate mines; capital, $1,000,000; incorporators, A. Thomon, Charles Thomon, John B. Whitehead.

Alhambra Mining Company, Chicago; to do a general mining business; capital, $1,000,000; incorporators, Abner Hurd, J. R. Young and C. M. Stone.

The Bland Mining Company, East St. Louis; to do a mining business; capital, $1,000,000; incorporators, F. H. O'Brien, J. M. Wallace, and William T. Masonfield.

The Cherry Valley Iron Company's furnace at Leetonia, O., which was blown out August 3d, is in operation again with new lining, a new bosh and other improvements.

American Malleable Iron Company, at Chicago, for the manufacture of malleable iron castings; capital stock, $300,000; incorporators, E. P. Bailey, H. S. Burkhardt, and Clayton Marks.

As a result of an extension of the Philadelphia and Reading Railroad system Bowmansdale, Pa., is to have a large plant for the manufacture of steel by a new process of the Bessemer order.

A press dispatch says that ground was bought in Pittsburg, Pa., on the 19th inst. upon which will be erected extensive works for the manufacture of tin-plate as soon as the Tariff bill becomes a law.

The long strike at the works of the New Jersey Steel and Iron Company, at Trenton, N. J., has been ended by the submission of the men, they returning to work without the firm signing the scale.

The Struthers Furnace blew in on August 1st, after being out five weeks for repairs. The furnace has been overhauled and will be continued in blast by its present lessee, the Ohio Iron and Steel Company, of Lowellville, O.

The Jefferson Iron Works at Stubenville, O., were partially destroyed by fire on the 18th inst. The rolling and heating department and one fire proof nail factory were saved. The loss is $75,000 to $100,000; insurance, $63,000. The fire throws 400 persons out of employment.

The two charcoal stacks of the Antrim Iron Company, at Grand Rapids, Mich., are both in operation, and the product now averages 150 tons a day of a high quality of car-wheel and malleable pig iron. One of the stacks is 48 by 8½ and the other 48 by 10 feet.

Ella Furnace, of the Wheeler Furnace Company, at West Middlesex, Pa., is undergoing repairs at present that will cost about $40,000. Workmen are engaged in tearing down the hot blasts and removing the machinery, which will be replaced by two new blowing engines and two hot blast stoves.

At the annual election of officers of the Cresson & Clearfield Coal and Coke Company, on the 20th inst., Hon. John Dean was re-elected President, Mr. C. J. Wittenberg, Vice-President, and Mr. R. J. Cross (of Morton, Bliss & Co.,) Treasurer. Mr. George T. Bliss was elected to a position on the directorate.

The Lancaster Steel Roofing Company, of Lancaster, O., will move its plant at once to Duluth, Minn., taking a site near the plant of the Ironton Steel and Iron Company. In Ohio it employed 25 men, and it is expected that in its new plant it will employ 100 men. They manufacture steel roofing plates 8 by 2 feet.

Mr. J. W. Norton, manager of the New Duluth Land Company, recently returned from Green Bay, Wis., where he completed a contract for the transfer to New Duluth, Minn., of the Atlas Brass and Iron Company's Works, of Kaukauna, Wis. The company will be reorganized, with a capital of $200,000, and will employ 125 men. Their specialty is the manufacture of paper mill machinery of all kinds.

The work of removing the plant from Kentucky will begin October 1st. Large ore and coal docks, 2,000 feet long and 200 feet wide, will be built on the water front of the site. The manufactured product of the mill in full running order is 200 tons per diem. The Ironton Land Company will lay out a town site in the vicinity of the steel and iron mills, and short line train service will be secured within a few weeks to the new town.

The Fishkill Landing Machine Company, we are informed, find that the additions they made to their works at Fishkill-on-the-Hudson last spring are inadequate to enable them to meet the increasing demand for the Fishkill-Corliss engines. They will, therefore, make further additions in the early future. The machine, boiler, pattern and blacksmith shops, foundry, etc., are large, and fully equipped with all the latest improved tools and appliances necessary. The company employs 150 hands.

INTER-STATE INDUSTRIAL EXPOSITION OF CHICAGO.—The eighteenth consecutive annual exposition of this organization will open September 3 and close October 18. This exhibition in all its departments promises to be one of more than usual interest. Space has all been taken and preparations for the various exhibits are in active progress. The management is sparing neither labor nor expense to make this year's exhibition memorable as the most complete and attractive ever held in this country.

Gordon, Strobel and Laureau, Limited, of Philadelphia, have closed contract with the Leesport Iron Company, of Leesport, Pa., for a plant of two 18×60 Gordon-Whitwell-Cowper fire-brick stoves. They have also contracted with Eckert & Brother, Reading, Pa., for a plant of two 17×60 stoves of the same type; the Junction Iron Company, Mingo Junction, Ohio, for four 20×70 fire-brick stoves, and with the Lawrence Furnace Company, Lawrence Furnace, Ohio, for two 14×60 stoves of the same kind. They have now under construction, 28 of these stoves.

LARGE INCREASE IN THE PRODUCTION OF PIG IRON.—The Superintendent of the Census has issued a bulletin on the production of pig iron in the United States during the year ended June 30, 1890. He says: "The production of pig iron, including Bessemer, during the year named aggregated 9,579,779 tons (of 2,000 pounds to the ton), as compared with 3,781,021 tons produced during the census year of 1880, and 2,052,821 tons during the census year of 1870. It will be gratifying to notice the great strides which the Southern States have made in the manufacture of pig iron since 1880, the total product in that year being 350,436 tons, as against 1,780,909 tons in 1890. The development of the manufacture of pig iron in the United States during the ten years from 1880 to 1890 has been phenomenal, and at the present rate of increase in production this country is destined soon to become the leading producer of pig iron in the world, possibly reaching this distinction in the calendar year 1890."

Articles of incorporation of the Ironton Steel and Iron Company have been forwarded to the Secretary of State, Minnesota. The capital is $1,000,000. The incorporators are: J. J. Sullivan & Co., of Cincinnati; F. M. Williams, of Newport, Ky.; Col. William Duffy, of the John Boyle Distilling Company; Capt C. W. Boyd, of the Lavonia Mill and Lumber Company; Dr. J. L. Wylie, of West Virginia, and Messrs. Atkins and Barrett. The company is organized to take charge of the Swift Harper steel plant now located at Newport, Ky., and transfer the same to a site at Duluth, Minn., consisting of ten acres from each of lots 2 and 3 in section 23, town 49, range 150. Of the twenty acres of the site, from eight to ten acres will be under roof. There will be eleven mills in all, besides the converter. It will require between 15,000 and 20,000 horse power to run the plant. Each mill will be run by its own power. The plant will be finished and in running order, under contract, by August 1st, 1891, and work will begin soon in clearing the site of the mills. All the buildings will be built of iron and steel. They will be one story in height.

(From our Special Correspondent.)

The Weston Furnace Company is progressing rapidly with the construction of its plant at Manistique, Mich. The foundations are about completed and it is expected to go into blast before Jan. 1, 1891. The furnace will have a 65-foot stack and a 12-foot bosh and will heat the blast with two iron pipe stoves. It is in the midst of a hardwood country and the company claims to be able to make charcoal at 6 cents per bushel. The location is 100 miles from the Menominee and 150 miles from the Marquette range. Mr. H. Duval is secretary of the company and Mr. Jackson, formerly at the Florence (Wis.) furnace, will doubtless be head founder.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

1,022. Two 75 horse-power or one 150 horse-power automatic engine, two 100 horse-power tubular boilers, and wire rope or other transmission of power; machinery for wheel mills (8 to 10-ton wheels), corning mills, making powder kegs (sheet iron), and grinding damp nitrate soda fine; boiler iron retorts and furnaces combined for making charcoal; also steam pumps. Ohio.

1,023. Ammonia machinery. Georgia.

1,024. Prices on machinery to manufacture cheap furniture, sash, doors and blinds. Georgia.

1,025. Shafting, pulleys, emery wheels, blast blowers, tuyere irons, etc. Alabama.

1,026. A heavy power mortiser, seven-inch four side molder, and a shaper table. Virginia.

1,027. A 40 H. P. engine and boiler. Virginia.

1,028. Steel, iron and slate roofing. Virginia.

1,029. Bids for the erection of 25 bee-hive coke ovens. West Virginia.
1,030. Spoke and handle machinery; also wood splitting and hand saw machines. Georgia.
1,031. A second-hand 36-inch gauge engine, weight 12 to 16 tons; also four logging cars, and two miles of 20 to 30-pound iron or steel rails. Mississippi.
1,032. A mill to grind guano. Virginia.
1,033. A 6,000-gallon tank and pump. Georgia.
1,035. A powerful steam dredge for sand and hard clay, for dredging a canal through Mustang Island, Texas.
1,036. Best and latest improved machinery for mining quartz. North Carolina.
1,037. Planer, matcher and moulder combined. Georgia.
1,038. A steam drill punch, a steam shear to cut iron 1½ inches thick, and a steam iron table saw; want no catalogues unless parties write us best discounts from catalogue prices. Georgia.
1,039. A 50 to 80 H. P. engine and 60 to 80 H. P. boiler. West Virginia.
1,040. A water motor 10 H. P. or more. West Virginia.
1,041. Machinery for fertilizer and phosphate factory. Florida.
1,042. Two 30-ton ice-making machines for a brewery. Tennessee.
1,043. A 40 H. P. engine and a 56 H. P. boiler. New York.
1,044. One dozen Eastman globe fuel and kindlers. New York.

AMERICAN GOODS WANTED ABROAD.

1,005. Contractors wanted for rebuilding 1,500 houses in iron and brick, which latter is made here. Martinique.
1,008. Prices and particulars of a plant for a meat canning factory. Canada.
1,009. Prices and particulars of a plant for a beet sugar factory. Canada.
1,010. Prices and particulars of a plant for a tannery. Canada.
1,034. Agencies wanted of American goods. Australia.

GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including August 6th were as follows:

		Tons. 1890.	Tons. 1889.
Marquette,	Marquette District	705,063	785,522
St. Ignace,	" "	15,911	25,255
Gladstone,	Marquette District	6,183	519,089
"	Menominee "	28,837	10,366
Escanaba,	Marquette "	692,015	16,195
"	Menominee "	1,073,832	883,450
"	Gogebic "	*150,787	153,932
Ashland,	" "	*1,116,090	841,900
Two Harbors'	Vermillion District	456,700	486,863
Total, tons		4,215,418	3,722,572

*To July 30 only.

TIN IN CALIFORNIA.—The old Jacinto tin mine and 50,000 acres of land in San Bernardino county have been recently purchased by an English syndicate. In the directorate of this syndicate are the names of Sir John Stokes, J. R. Frances of Swansea, and N. S. West, of Cornwall. The project as announced is to put up a plant, open up the mines, build dams and establish a mining town. The purchase price of the property was $400,000, and the capital of the company is fixed at $2,525,000. Stocks are unloaded at $5 a share, of which 500,000 are to be issued.

The property is reported to have some fifty tin-bearing veins, and the ore to contain 10 per cent. of tin; of this, however, there seems to be some doubt among the experts, and as the owners have been doing their best to dispose of the property for fifteen years, and the property was reported on by the government inspectors sent out to examine the ore as not being all that was claimed by the San Jacinto people; the real status of the enterprise is not yet absolutely established.

It is said to be the intention of the owners, should the tariff on tin be doubled as is recommended, to engage in the manufacture of plates, which can be made at 2 shillings a box less than the cost of imported plates, and have a margin of $2.40 a box in freight and duty.—*Exchange.*

ARIZONA.

COCHISE COUNTY.

SILVER KING MINING COMPANY.—Superintendent J. O. Groves makes the following report for the week ending August 9: During the past week the northeast drift on the 980 level has been passing through a soft rock, but is now hard again, and the character of the rock is the same. The total length is 170 feet. The advance is 22 feet, and a force of 3 miners was employed.

The Bilk shaft is now in a dark green porphyry, but of a softer nature than the previous week. On the evening of the 2d the shaft men struck for $4 per day, an increase of 50c. a day. By the strike we lost one shift's work, and also lost one shift putting on a new sheave, the old one being worn out. The total depth below the 980 level is 76 feet. A force of nine miners has been employed, and the advance is 11 feet; 210 tons of tailings worked yielded an average assay value of 11.42 ounces. The bullion shipped was five bars, aggregating 7,432 ounces, valued at $3,439; bullion on hand, 177 pounds, value $1,470; amalgam, 150 pounds, value $150.

CALIFORNIA.

NEVADA COUNTY.

BRUNSWICK CONSOLIDATED GOLD MINING COMPANY.—Mr. H. R. Lounsbery, the treasurer of this company, has received the following letter, dated the 14th inst., from the superintendent of the mine: "Six men have been kept at work. The shaft has been sunk 10 feet during the week. The ledge continues; the walls are hard, but show symptoms of change. It breaks well, but it is hard, tough ground to drill. I consider that I am making good progress in such hard rock. In the east and west drifts I sank a small winze, and found the quartz holding and showing well in mineral. I have very little water to contend with."

COLORADO.

CLEAR CREEK COUNTY.

(From our Special Correspondent.)

AMERICAN SISTERS.—Nearly a full force of men is now employed on this property. The principal work is being carried on in that part of the mine formerly known as the Native American.

BURLEIGH TUNNEL.—The lessees have shipped something over 500 tons of concentrating ore this summer. But little work has been done on this property this year, the ore bodies now open being quite meagre. It is probable that work will be resumed with renewed activity in a short time, and a shaft sunk below the tunnel level.

CENTENNIAL.—Considerable of this ore has been milled by the ordinary process of concentration. There being some free gold present the management thought amalgamation of the gold might be the better process, but it was found that the gold saved on the plates was simply robbed from the concentrates without reducing them sufficiently in value to make them worthless for smelting; consequently concentration is the better process, as it saves the gold quite as well as the double process, and makes a more desirable product for the smelter, besides being cheaper.

COLORADO CENTRAL.—Work is progressing on this property as usual. The adverse verdict of the jury in last winter's law suit does not seem to interfere to any noticeable extent in the working of this mine. Both parties have, however, been preparing for another trial which is expected to take place this coming winter. It has popularly been supposed that the large dumps from this mine contained 8 or 10 ounces silver per ton, and that a very large part of them could be concentrated at a profit. Some tests recently made seem to prove quite conclusively that the popular opinion was wrong, as is generally the case in such a matters, the stuff being too low in grade to warrant any expenditure for its concentration.

FREELAND.—The pumps have been taken out of the lower levels of the Freeland, and the mine is now full of water to the tunnel level. A few men are at work opening ground in the upper workings.

KOHINOOR & DONELSON COMPANY.—The Champion mine, the only one of this company's properties which has been worked for some time, employs but 10 or 12 men at present. The mill has been shut down for some weeks, but now has been leased to parties for the purpose of milling custom ore. The Kohinoor, which has been neglected for some time is now being put in condition for work.

SILVER AGE.—The concentrating mill of this company has, too, been shut down for some months. The company is, however, overhauling its mining machinery which looks as if they intended to prosecute work more diligently in the future.

INDIANA.

SULLIVAN COUNTY.

A dispatch from Farmersburg says that an explosion occurred in the McCracklin coal mine on the 19th inst., caused by gas becoming ignited from a miner's lamp. Three men were killed.

KANSAS.

CHEROKEE COUNTY.

A special report shows that during the week ending August 16th the output of ore from the mining district of Galena and Empire City was: Rough ore, pounds milled, 2,431,870; zinc ore, pounds sold, 828,000; lead ore, pounds sold, 95,000. Sales aggregated, total value, $11,069. Total value of output, $12,569.

MICHIGAN.

COPPER.

(From our Special Correspondent.)

ATLANTIC COPPER COMPANY.—This picturesque little mine is working away, off by itself, according to its own methods. A recent visit to the mine showed a very satisfactory degree of thrift and economy that would be delightful to stockholders.

The new engine house is practically completed. It is substantially and neatly built of variegated sandstone. It contains a double-hoisting engine, 20×60, Corliss valves, built by M. C. Bullock & Co., Chicago. It is built for a hoisting skip and a balance.

The drum is in two parts, each being the frustum of a cone, the larger bases being 21 feet in diameter, and so joined that a surface is presented for the application of a steam brake. The smaller bases of our frustums have diameters of nine and eleven feet respectively. This arrangement is supposed to give an exact balance at all points. The new compartment at No. 3 is not quite ready but will be in a few weeks. While they are finishing the new shafthouse the skip in No. 4 shaft will be attached and the balance tried in this way. The ground is reported as looking very good—as good or better than for some time previous.

ASHLAND MINING COMPANY.—This mine is making its customary shipments of high grade Bessemer ore to Lake Erie ports. A cave is expected soon, and no locomotive is allowed to cross the property at the present time. In case a cave occurs it will require a new spur to be built on the foot-wall side. The present spur crosses the formation from, hanging to foot.

AURORA MINING COMPANY.—The recent cave at this mine turns out to be far less disastrous than was at first expected. The cave extended from No 3 to No. 4 shaft, and from the surface to the fifth level. No. 3 shaft is entirely closed, but will probably be reopened, or a new shaft sunk in nearly the same location. The caving from the surface was not expected, as there were no cracks, fissures, or other indications of weakness. A heavy locomotive passed over the spot barely seven minutes before the cave occurred. The small amount of ore from the stock pile which was precipitated into the cave has been wheeled up. The Lake Shore tracks on the hanging wall have been abandoned, and a new track is surveyed on the footwall, which will be completed as rapidly as possible. The producing power of the mine was not affected. The ore from the pillars in the caved portion of the mine is already being removed at the fifth level.

CALUMET & HECLA MINING COMPANY.—At the annual meeting of this company, held in Boston, Mass., on the 20th inst., the following gentlemen were unanimously elected directors for the ensuing year: Alex. Agassiz, Quincy A. Shaw, H. H. Hunnewell, Francis L. Higginson, James N. Wright; 74,748 shares were voted. Col. Livermore presided at the meeting, and President Agassiz read a very complete report of the operations of the company for the past year, of which the following are the salient points: The company produced 51,986,745 pounds of copper during the fiscal year ending April 30th, 1890, and is now producing at the rate of over 60,000,000 pounds per annum. After discussing at length the physical condition of the mine and the improvements which have been necessitated because of the two fires, Mr. Agassiz said: "By the spring of 1891 the lower openings of the old mine ought to become accessible from the Red Jacket shaft, and as soon as its equipment is in place we shall have about ten levels, of openings along the length of about 4,400 feet from north of No. 5 Calumet to No. 3 Hecla available to increase our product in connection with what can be done through the old shafts of the mine, which by that time should be in their old working order again; equal to about ten years of our present production. After the Red Jacket shaft is in commission and has reached the lode it will be possible to have practically three independent mines, each one of which, it is expected, will give nearly the present product, so that productiveness will not be jeopardized again as it has been since the beginning of the fires in 1885. The company is now stamping at the rate of 850,000 tons a year, of which 600,000 comes from the South Hecla. The percentage of copper in the rock has gradually decreased as the company has lengthened the working drifts to the north and south, and it does not get at either extremity the high percentage which characterized the mine from 1878-1884, when it was only stamping from 259,000 to 400,000 tons a year, taken from the center of the long line it is now exploiting. The rock from the South Hecla does not give more than 3·25 per cent. of ingot, while the rock of the old mine averages 4·357 per cent. and more The decrease of percentage of copper has been apparently aggravated by the greater per cent. of rock which remains in the mineral as it is now dressed, compared to former years. The copper now averages 66·7 per cent. while it formerly ran as high as 79 per cent. Mr. Agassiz further said: "Taking the estimated area of productive ground still available above the 4,000 foot level along the dip of the lode, we have something over twice the ground already stoped still available, and from the 4,000 foot level to the boundary line at least four times that amount, so that if our copper chutes continue as they now trend to the bottom of our mine we may assume the life of the mine to be about 40 years of double our present production. . . . The cost of production has steadily decreased in proportion to our improved facilities; it now is not more than 4-7 of what it was some years ago."

EUREKA MINING COMPANY.—This property will make a grand showing for a mine in its first year. The railroad spur was not constructed nor the mine opened up at the opening of navigation this spring. Regular shipments are being made to the Ashland docks of two to three hundred tons daly.

GOGEBIC RANGE.—There is not, at the present time, an option obtainable on mineral lands lying favorably on this range from Wakefield to the State line at Ironwood. The surface "scratching" of former "boom" times has been abandoned, and working shafts are employed with the expectation of deep sinking. No shipping mines have been

added to the list recently. The mines and explorations extend in an unbroken line for a distance of 15 miles.

The granting of an option on East Dangler to two different companies has given rise to legal complications, but has not retarded the development of the property. Both companies are pushing the work at different points with promising results. It is expected that some compromise will be effected between the disputing claimants in the near future.

HURON COPPER COMPANY.—The rumor that the Huron has struck a very rich piece of ground is not confirmed yet at the mine. Shaft No. 6 is down below the 2,000-foot level, and I am told has a slightly improved appearance. The July product is not yet announced. The surface works are kept in very good condition. The greatest necessity at present seems to be for more compressors. The two pairs that they have work only 22 drills, which is hardly enough to keep a sufficient amount of ground opened out. It is a very difficult mine to work, and the management deserves much credit for its skill and perseverance.

KEARSARGE.—The explorations on the two conglomerates have been discontinued and the company is exploring the Osceola amygdaloid. Just why the search on the Iroquois was abandoned is not known. The outlook was certainly promising; something may be heard from it yet. It is rumored that insiders are buying heavily, and your correspondent knows that many Lake holders are confident on this account. At the past rate of production from 60 to 70 tons mineral per month, and copper at 17, Kearsarge is worth $18, not taking into account its prospective value.

NORRIE MINE.—The production of ore at this mine is limited only by the number of cars furnished by the railroad company. Last Tuesday over four hundred cars were loaded and shipped, containing 8,440 gross tons. This is reported to be the greatest record ever made by one mine in one day. The total output is expected to reach nearly one million tons.

PACIFIC.—The property mentioned last week was not definitely located and the exact description may be of interest: The north half of section 4 and all of section 5, town 54, range 34. Captain William Tonkin is already on the ground and is making all necessary preparations for sinking a shaft. R. R. Goodell, the resident agent of the canal company, informs us that there is a possibility of organizing another company after the same manner as the Pacific and opening a mine south of the Atlantic.

PENOKEE AND GOGEBIC DEVELOPMENT COMPANY.—This company is doing a considerable amount of exploring and development work east of the Colby workings on Section 15. A diamond drill is being employed, and drill-hole will be sunk with of striking the foot wall of the formation at not less than 800 feet from the surface. One thousand feet east of No. 5 shaft a new shaft to be designated as No. 6 has been begun at a distance of 650 feet from the front wall. It will be vertical, with three compartments, and worked with cages. This will be the first shaft to use this method of hoisting on this range, and the result of this modification in hoisting will be of great interest to all the deeper mines on the range.

The same company is greatly improving the Palms mines and new machinery has been added, a new engine house has been built for the new plant consisting of two six foot drums. A boiler house containing a new 80 horse power boiler has been erected, and a new shaft house has been built at No. 4 shaft.

PENINSULA.—At present the Peninsula is "in a box." For over a week it has been without a supply of coal, which is the fuel used. The misfortune occurred through some misunderstanding between the Eastern office and shippers. The company hopes to have the mine started with no longer a stoppage than ten days at the most.

The new shaft on the Perratic lode is down 125 feet, and they began drifting both ways this week. This shaft has a bright outlook. So far as they have gone, there has not been a foot of ground that does not contain copper in paying quantities. Supt. W. A. Dunn says that all the rock taken out will yield 1½ per cent. of ingot. It will be remembered that the mineral from this lode is of a very high grade. A second test of the value of the lode has been made by means of a diamond drill, which was started from a point 800 feet down in No. 2 shaft in the old workings, going west. At 470 feet they found the Pewabic lode as they expected, and it made a fine showing—even better than in the shaft itself. The drill is now in over 500 feet and is making some valuable explorations. We hope to be able to give the results soon.

It will be remembered that some time ago a cross-cut going east, or rather at right angles to the vein, from a point 400 feet down and 90 feet north of No. 2 shaft was started. This has been driven in about a thousand feet. Some thirteen or fourteen lodes have been found, but none carrying copper in large quantities. Some of them appeared very promising, and they were followed in some distance, but have been abandoned. Perhaps enough copper has been taken from this cross-cut to pay the expenses of drifting. The work is still going on.

SUNDAY LAKE MINE.—This property, after lying practically idle for a year and a half, has been reopened, and it is expected that the work of mining and developing will be rapidly pushed under the management of the Schleisinger syndicate. The vein of ore is not wide, as far as it has been developed previously, but the quality of the ore is excellent.

TAMARACK.—The reference made last week to the vibration of No. 2 rock house seems to have been taken for more than was meant, by one or two persons connected with the mine. The slight vibration of the building is immaterial. Perhaps if the upright engine had been put in, as was first intended, the vibration would not have been noticed.

When the new compressors are working an increased output will be expected from the Tamarack. It is a mine of grand possibilities, and with a most excellent management.

IRON.

(From our Special Correspondent.)

MARQUETTE RANGE.

DEXTER.—This company has contracted to deliver 2,000 tons of 15 per cent. manganese ore in Chicago. On account of its low percentage of iron, only 45, this ore has, until recently, been rejected by buyers, but now it brings a higher price than many high-grade ores on account of its manganese.

GROVELAND.—This company's mine is near Felch mountain. The owners commenced operations with great expectations, which three years of work have failed to fulfill. The ore, of a very low grade, is unsalable, and the company has resorted to the concentrating method, putting up a large plant at considerable expense. The essential features consist in crushing to 80 mesh and dumping on an inclined trough down which a current of water flows, a series of riffle bars being carried counter to the current by an endless chain. Success has not yet attended the experiment. Much ore passes off in the tailings, while large pieces of rock are found in the concentrates. The ore seems well adapted for washing, being a soft crystalline specular with chloritic and steatite gangue, also containing crystals of dolomite. Even if the experiment proves to be a metallurgical success, the process is crude and wasteful, and apt to be a financial failure though the owners hope to sell the fine concentrates for "fix" at an advance over the price of lump ore.

SECTION 15.—A discovery of ore assaying 60 per cent. has recently been made by Geo. W. Joslin on Section 15, town 48-26. This discovery is of interest, inasmuch as it will contradict the accepted saying, "There is no iron ore east of the Negaunee range," if it proves to be as extensive a deposit as it promises to be. The formation has been traced three miles, and constitutes a district range lying two miles east and four miles north of the Negaunee range.

THE LUMBERMAN'S MINING COMPANY.—The Ludington mine which is operated by this company was the field of a development during the year of 1889, which has given to it a new and, it is thought, long lease of life. The property lies on the iron formation, west and adjoining the Chapin and Hamilton mines, Monominee range, Iron Mountain. It is described as the S. E. ¼ and the S. E. ¼ of the S.W. ¼ of sec. 25, town, 40, range 31.

It is a well-known fact that the Chapin vein as it approaches the west line of that property, becomes more and more divided into small lenses having a jasper filling, until in the Ludington the characteristic is most marked. The openings disclosed a series of overlapping, parallel and clearly defined lenses. These were worked as far west as "C" shaft, and to a depth of about 1,000 feet. Something more than half a million tons of ore were taken out, gradually exhausting the deposit, until it became evident that the company would be compelled to strike a new deposit or number its days by the pillars of the mine. About this time the Hamilton Ore Company struck ore 843 feet from the surface. From the nature of this deposit, the territorial relation to the two properties, the dip to the north and the pitch to the west, and the location of one shaft with respect to the other, "A" Ludington being 250 feet north and 250 feet west of No. 1. Hamilton, it became the belief of Supt. Robt. Bankes of the Ludington that it would only be necessary to sink far enough in order to strike this same ore body in his company's property. The deposit was found sooner than was expected and almost by accident. While running a cross-cut east from the 12th level of "A" shaft to meet one from the Hamilton, and when about 16 feet from the shaft, a capping of jasper was encountered, which on being penetrated showed that the body of ore lay beneath. Subsequent openings proved this ore to be as follows: The lense dips west at an angle of 40 degrees. Hence the twelfth level as it cuts into the lense widens from 10 feet to 40 feet in the second room opened. Further east towards the Hamilton the vein has not been cross cutted. A width of 100 feet near the line is expected. The 11th, 12th and 13th levels are now being opened in the new ore. From the character of the walls, the dip, pitch, strike and the composition of the ore—it being 63 in iron and ·07 in phosphorus—as shown by the openings, the firm conviction has taken hold of the mind of the Ludington management that it has the Hamilton, and if you will, the Chapin ore, and in large quantities.

Although the future operations of the mine will be based on this new discovery, it will not be amiss to describe briefly the old openings of the mine. On the "Chapin formation" proper there are four shafts, "A" being the easternmost. It is a four compartment vertical shaft, in the hanging, 1,300 feet deep, and is equipped with balance cages. It is the water shaft of the mine. "B" is a three compartment shaft, 800 feet on the incline. In it are two hoists and a timber way. "C" shaft is in the foot wall, and is 1,100 feet deep. In it are worked two cages. "D" is an old single compartment shaft, used for taking out the pillars. The shafts are connected every 100 feet by levels.

The old mine, so called, is located 1,000 feet west of "C" shaft. It is to be connected on the sixth level by a cross cut. The ore deposit in these workings is believed to lie south of the real vein, and consists of a number of kidney-shaped lenses, now about exhausted. Two shafts have been sunk—"E," a vertical shaft, being 320, and "F," an incline shaft, 175 feet deep. From this section of the mine 9,000 tons of ore were produced in 1889, and about the same number will be put out during the present season. The ore of this deposit is of a superior quality, carrying 68 per cent. in iron and ·012 in phosphorus. The ore in the main workings of the mine carries 65 per cent. in iron and from ·02 to ·2 in phosphorus. Production has been curtailed this season owing to the straightening of "C" shaft. It was 13½ feet out of plumb; in order to eliminate this crook it was found necessary to sink a new shaft from the surface, making connection with the shaft at the 300-foot point. While this work was in progress, "A" shaft was necessarily used as a man, rock and timber way. This work has now been completed, and it is expected that the mine will put out 116,000 tons this season. Preparations are being made for an output of 300,000 tons in 1891. During the past year a new machine and blacksmith shop has been erected. The foundation for a new engine house is now going up. A Cornish plunger pump of 600 gallons a minute capacity keeps the mine free from water. The hoists consist of four 12 foot drums with engine cylinders 24×48 inches. The new hoist for "B" shaft consists of three 18 foot drums with engine cylinders 30×72 inches. The mine has all the modern improvements, among which might be mentioned commodious buildings, a complete system of side tracks and electric light. The company owns one-third of the Hydraulic Power Co., of which the Chapin Mining Co. is two-thirds owner. This plant furnishes the entire motor power for the mine, working the following cylinders: 3 (24×48), 7×10, 3 (6×8), 2 (8×10), 2 (7×9), 8×10, 2 (7×9), 8×10, 2 (14×18), 12×14, 6×9, 10×14, 2 (10×12), 10×16, 14×23, and 14×24 power drills.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Aug. 18.

The zinc ore market opened with an upward tendency, and the ore buyers were in the field for all they could get. However, some large lots were held for still better prices. There was no change in the lead market from the previous week. The following are the sales of ore from the different camps: Joplin mines, 1,392,060 pounds zinc ore and 177,390 lead; value, $20,433. Webb City mines, 761,140 pounds zinc ore and 54,960 lead; value, $10,027.

Carterville mines, 1,121,530 pounds zinc ore and 36,920 lead; value, $14,811.

Zincite mines, 258,340 pounds zinc ore and 1,850 lead; value, $3,134.

Lehigh mines, 126,350 pounds zinc ore; value, $1,575.

Carthage mines, 284,500 pounds zinc ore and 7,300 lead; value, $3,592.

All districts' total value, $53,572. No report from Galena, Kans.,

Messrs. Charles Schifferdecker and J. A. Craighin, of the First National Bank of Joplin, last week purchased 1,600 acres of undeveloped mineral land between Shoalsburgh and Neosho, Newton Company. The price paid was $10 per acre.

Mr. A. F. Dorman has resigned his position as superintendent of the Consolidated Mining Company and opened a civil engineer's office. Mr. Dorman has run lines in this district 15 years ago.

Mr. John Price Wetherall, of Philadelphia, Pa., vice-president of the Empire Zinc Company, of Joplin, has arrived and will spend two weeks in looking after the interests of the company. Mr. Wetherall visits this section quite frequently, and remarked to your correspondent that he could see great improvements in the city of Joplin at each visit.

DIAMOND MINING COMPANY.—This company reports an output for the week ending Saturday of 365,000 pounds zinc ore and 50,000 pounds of lead.

GRETCHEN COMPANY.—This mine, in East Hollow, turned in last week 16,020 pounds zinc ore.

SNYDER BROTHERS have now their new concentrating plant, one of the most complete in the district, in full running order. The ore is delivered on the crusher floor from an elevated tramway connected directly with the mines. The ore after passing through the crushers rounds directly to a

set of rolls, and is then elevated to the sizing screens, from which it is distributed automatically to the concentrators, which separate the gangue from the ore.

Similar improvement must come in the way of steam hoisting plants. Almost one-half of our lead and zinc ore is raised from the mines by the aid of a horse or mule attached to a power hoister that pulls up a bucket or tub containing about 200 to 300 pounds of material, and from a 100-foot shaft it requires about five to seven minutes to hoist the bucket up and dump the contents on the platform, a state of affairs wh ch the energy of our people and the more extensive knowledge of the vast resources of the district soon will make a thing of the past.

MONTANA.

BEAVERHEAD COUNTY.

LONE PINE MINES.—A mining deal has been consummated in the sale of these mines to an English syndicate for $525,000. This property is situated in the Vipond mining district and is well-known in Helena, where a company was incorporated to work it last year after it had been brought to the attention of capitalists of Helena and of Michigan by Messrs. Churchill and Luther. The present sale has been pending for some time, the English syndicate having examined the property as long as a year ago and having evinced a desire to purchase ever since. The Michigan stockholders desired to hold on, owing to the promising developments of the past year, but the sale has been finally effected as stated. The property consists of six claims, carrying veins of free milling silver ore, some of which has been quite extensively developed. There is also a new 10-stamp mill on the ground.

NEVADA.

ELKO COUNTY.

NAVAJO MINING COMPANY.—At the annual meeting of this company, the following directors were elected: E. Scott, President; F. A. Berlin, Vice-President; H. H. Pitcher, T. J. L. Shackleford and John W. Pew, Secretary. The Bank of California was appointed Treasurer and R. M. Catlin, Superintendent. The company has an indebtedness of $11,555.46.

ESMERALDA COUNTY.

MOUNTAIN QUEEN MINING AND MILLING COMPANY.—A meeting has been called of the incorporators of this company to complete its organization. In this company are included a number of NEW YORK capitalists, who have bought the property formerly owned by the Columbus Consolidated Mining Company, the General Thomas Mill at Columbus and other property in this district. The company is incorporated under the laws of Nevada and will have their principal office at Candelaria, with a transfer office for their stock in New YORK City.

STOREY COUNTY—COMSTOCK LODE.

The proposition to extend the Sutro Tunnel west through Mount Davidson has not materialized. The extension of the tunnel west of the main Comstock lode, it is said, would probably have begun last year had it not been for the litigation pending between the Comstock Tunnel Company and the mining companies on the question of the payment of ore royalties. Until this litigation is settled no movement in that direction will be made.

NEW JERSEY.

ATLANTIC COUNTY.

A press dispatch says that the residents of Pleasantville were greatly excited a few weeks ago by the discovery of a supposed silver mine. A shaft has been sunk, and the owners of the property, Mrs. Mary A. Riddle and Mrs. Charles McGlade, have hopes in the find, and have men still working in the mines. It is reported that experts who have assayed samples of the ore say that it contains enough silver to pay for working it.

NEW MEXICO.

GRANT COUNTY.

AZTEC MINING COMPANY.—This company has struck the contact of the Kleptomania and Aztec veins in the Kleptomania shaft, and a large body of ore is reported. From the place of contact to the surface the Aztec vein, although it is from two to three feet wide, is not very profitable to work on account of its low grade. The Kleptomania vein has carried good ore, and it is believed that below the junction of the two veins the ore will be found to be much improved.

HIDDEN TREASURE.—Two carloads of copper ore have been shipped from this mine at Hanover within a week. This adds another to the growing list of copper-producing mines in Grant County. Last year the copper product of this county was practically confined to one mine, and amounted to $51,000. This year's product will be greater, owing partly to the increased price of copper and partly to the reductions made in freight on ores by the Atchison, over whose lines goes nearly all of the re shipped from New Mexico mines.

PACIFIC GOLD MINING COMPANY. — Half the stamps in this company's mill at Silver City have been started, and the rest will be put in operation as soon as the water company can supply water enough to keep them running. There has been plenty of surface water for several days to supply mills which could utilize it, but the Pacific is supplied by a pipe from the city reservoir. The Silver City *Enterprise* says that the company has leased its property to J. C. Carero, a well-known mining expert. Several propositions to lease have been tendered the company, but only the one above noted has ever been entertained by the management, and royalties guaranteed amounting to $1,000 per month have been declined.

SIERRA COUNTY.

SILVER MINING COMPANY OF LAKE VALLEY.—This company owns several mines at Lake Valley and the output has been increasing since its reorganization. The company is now working in high-grade ore. It is reported that more than $100,000 has been taken out since July 1.

SOCORRO COUNTY.

LAST CHANCE MINING COMPANY.—This company has been incorporated. The incorporators are: R. F. McComas, M. L. Hayward, Robert Lorton, W. L. Wilson, Robert Payne, of Nebraska City; O. S. Lyford, Chicago, and Alexander R. Kerr, Red Oak, Iowa. Capital stock, $1,250,000. Principal place of business, Cooney.

OREGON.

LINN COUNTY.

ALBANY MINING AND MILLING COMPANY.—Mr. Hallettsen, superintendent of this company's mine, reports that free gold exists in the quartz from the Bonanza ledge. It is said that machinery will be immediately put in to work the ledge.

PENNSYLVANIA.

COAL.

The Hill Farm Mine at Dunbar has been opened, but the party searching for the remains of the entombed miners was again driven back by the heat.

The central breaker of the Delaware, Lackawanna and Western Company at Scranton was burned on the 18th inst. The loss is $100,000 Fully 500 men and boys are thrown out of employment. Nine men and 50 mules were in the mine at the time of the fire, but were rescued by means of the air-shaft and slope.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to August 15th, were as follows:

	1890. Gals.	1889. Gals.
From Boston	1,884,817	3,051,269
Philadelphia	93,670,447	89,430,648
Baltimore	7,910,860	3,591,975
Perth Amboy	8,874,596	11,911,524
New York	253,864,147	271,122,006
Total	366,204,867	379,107,422

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From our Special Correspondent.)

RAPID CITY, South Dakota, August 18.

The mines in the Bald Mountain, Nevada Gulch and Ruby Basin districts, as well as in the Carbonate district, all of which produce ore belonging to the refractory order, have really had hardly sufficient work done on them to determine either the extent of the ore body or average yield per ton. Several thousand tons of remarkably rich ore have during the past year been shipped away for treatment. The Seabury-Calkins, Buxton and Golden Reward have furnished the most of the gold-bearing ore, but nearly all the mines in what might be called the refractory belt carry both gold and silver. Work is being now pushed on those mines I have mentioned.

MONTANA.—The shutting down of this mine, in the Rochfort district, is at present creating a good deal of discussion in mining circles in the hills. This property was discovered by McKay, Boyd and Umphey in 1878, about the time of the location of the Standby mine. The Montana is about three miles up Little Rapid Creek from the Standby. The ore is a low grade, free milling, and is found in chutes of various widths throughout the workings. But little attention was attracted toward the property until about a year since, when a Huntingdon mill was erected with the capacity of a 60-stamp mill, and Black Hillers were told to watch the results and see how tender-feet could make a mine pay.

To-day after watching about a year we are told that the mine was salted, and the chief owner left here a short time since vowing vengeance on the man who sold the property. The claim is made that previous to completing the purchase a test run of 50 tons of ore was made in the Lookout mill, and that while that run was being made a certain woman scattered about $200 of gold fillings over the plates. The result of this run they claim was $240, and that it was on the strength of this the balance of the purchase money was paid and the Huntingdon mill erected. Mr. Day, the seller of the mine, claims that the buyer had possession of the mine for nearly six months before the purchase was completed, and had ample opportunities to thoroughly test and examine the property. This statement is also a substantiated by reliable residents of the hills.

STEWART.—A controlling interest in this property was sold recently for $18,000 to D. A. McPherson, who undoubtedly acts as trustee for Orange J. Salisbury, of Salt Lake. This transfer may mean considerably more to the Black Hills than a casual glance discloses. The mine is located near the Ruby Basin, and produces the same class of refractory ore as those I have already referred to. Mr. Salisbury is one of the heaviest owners of Homestake and other belt mine stocks. The announcement is made by a local paper that the Homestake company contemplates erecting a smelter at Piedmont, the junction of that company's narrow gauge railroad with the Fremont, Elkhorn & Missouri Valley road, so that it is rumored that the Homestake is going to operate in the refractory belt.

THE CHLORINATION WORKS AND PYRITIC SMELTER.—These work s in Deadwood are running regularly, the former on ore from the Golden Reward Mine, in Ruby Basin district, the latter on ore from the Maggie, in Ruby Basin, and the Seabury-Calkins in the Carbonate district. Of course no one outside can ascertain the exact results, but sufficient has already been demonstrated to show the outsite world that both processes give satisfactory results on refractory ores. In the chlorination works a new barrel will soon be set in place, which will increase the barrel capacity from 18 to 40 tons a day.

UTAH.

BUSBY MINING COMPANY.—Articles of Association of this company have been filed at Salt Lake City. The object of the company is to operate and develop mines of all kinds and characters, including coal and stone of every description, in Emery and other counties in Utah. Salt Lake is named as the principal place of business, and the capital stock is placed at $500,000, divided into shares of the par value of $5. The consideration of said company issuing and delivering 10,000 shares of the capital stock to the incorporation is as follows: The Coal Fork Makin mine, located upon unsurveyed government lands, about eight miles from Castle Dale, Emery county, in what is commonly known as Coal Fork cañon; the Mysterious, in Straight cañon; the Liverpool Boy, in Huntington cañon. C. C. Reynolds is president; H. A. Ferguson, vice-president; H. A. Hooton, secretary; Matilda M. Busby, treasurer.

FOREIGN MINING NEWS.

AUSTRIA.

For the whole of Austria, the total value of the mining product for 1889 was 58,929,809 florins, or 9·22 per cent. more than in 1888. The total value of the milling products was 32,748,497 or 6·62 per cent. more than in 1888. The total value of the milling products was 32.748,497 florins, or 6·62 per cent. more than in 1888. The number of employés in mines was 100,497 and in mills 13,461. The value of the coal mined was 49,509,049 florins, employing 81,070 employés; of silver ore 3,130,016 florins, with 5,507 employés; of lead ore 1,137,547 florins, with 3,233 employés; of pig iron 23,577,454 florins, with 11,387 employés; of silver 3,198,420 florins, with 519 employés; of lead and litharge 1,770,003 florins, with 179 employés; of mercury 1,537,015 florins, with 273 employés; of zinc 1,101,028 florins, with 485 employés; of copper 583,638 florins, with 174 employés; of sulphuric acid 522,356 florins, with 193 employés. The saltworks gave a value of 21,575,855 florins, employing 10,005 hands.

CANADA.

PROVINCE OF NOVA SCOTIA.

A dispatch was received from the Spring Hill coal mine during the early part of the week saying that the strike had reached a critical point. The firemen and engineers had been allowed to continue work until the 16th inst., when they were ordered to quit. The latest news is to the effect that the strike has ended in a complete victory for the men. The management concedes all the demands originally made. The strike lasted two months, and is reported to have proved disastrous to both sides. Of the 11,000 miners who had been previously engaged, a large number had removed to other mines. Those who remained resumed work on the 20th inst. The loss to the men and companies is not far from $150,000.

It is said that the Joggins mines have been sold to an English syndicate, who propose to extend and improve them and build a railway up the river Hebert.

(From our Special Correspondent.)

COAL.—The strike at the Springhill Collieries, Cumberland County, which has lasted eight weeks, has finally been adjusted. The compromise arrived at, while facilitating the transactions between the company and the miners, will not involve any considerable increase in pay. The fact of the pumpmen leaving their work and the rapid accumulation of water in the pit, threatening the loss of the pumps, doubtless facilitated a settlement. The conduct of the men during the strike was exemplary.

The work of opening out the coal seams at Salt Springs, five miles east of Springhill, is being continued, and an engine and boiler have been procured to open the three-foot seam by long wall work. It

Pictou County work continues very brisk, some of the mines working overtime.

June returns show 99 ounces from 130 tons of quartz at the Oxford mine, Lake Catcha, and 104 ounces from 210 tons at the Philadelphia Gold Mining Company's mill at Brookfield. The Northrup mill, Central Rawdon, returns 164 ounces from 130 tons during July.

Boston Gold Mining Company.—At this property, in Malaga, Mr. Ballou is engaged in building a 10 stamp mill, to be ready December 1st, and has about 400 tons of quartz ready for the mill.

Quarries.—Considerable activity exists in the Cumberland quarries. Considerable amounts are used in the Chignecto Ship Railway, and large shipments are being made up the St. Lawrence.

A discovery of antimony is reported from Shelburne County, but no details as to its location, size, etc., are known.

Bras d'Or Marble Company.—This company claims to have found on its property at West Bay, Cape Breton, a deposit of marble available for building purposes, and of pleasing color.

PROVINCE OF ONTARIO.

(From our Special Correspondent.)

Port Arthur, Aug. 18, 1890.

The following sales have been made recently. A one-half interest in Location R 64, containing 80 acres, has been sold for $2,500. The property adjoins the Crown Point mine, and is entirely undeveloped. A. P. Bliss, of Saginaw, Mich., purchased on the 13th inst., for $4,000 cash, locations R 58 and R 59 lying immediately west and east of the West End mine and Shuniah-Weachu mine, respectively.

Mr. Bliss purchased the Palisades location a short time ago for $10,000, and has since refused $20,000 cash for it; he also refused an advance of $3,000 on R 58 and R 59. It is his intention to place all three properties under development early in 1891. By far the most important mining transaction that has taken place for some time is the sale of the West End Mining Company.

Captain Wilson has had a gang of miners out testing location R 366, which is situated northwest of Sand Lake. He reports having found leaf silver in gneiss, which at that point comes in at a depth of 11 feet.

Badger Silver Mining Company, No. 2 Vein.—Sinking has been resumed below No. 1 level, and a winze is being sunk 175 feet east from the shaft and No. 1 level is being continued west. The vein is strong and regular in size, and in just as rich ground as when last reported. The new steam friction drum hoist has been placed in position at No. 3 shaft, and is giving excellent satisfaction. They have 14 feet to sink to reach the depth of No. 1 adit level, at which point drifting will be commenced to connect with the level. No. 1, or the lower adit level, is now in a total distance of 300 feet, 90 feet of which has been driven. Since the Badger Company purchased this property (Porcupine), the whole of this distance has been in good ore, and have steadily increased in richness, the last 30 feet being all bonanza ground, with a good, regular vein, having an average width of 3 feet. The gangue of the vein is principally calcite, carrying both native and black silver. There is a band of witherite on the hanging wall, varying in thickness from 2 to 8 inches, very rich in argentite. This band appears to continue through the hill, as it is also found in the shaft 500 feet east from the breast of the level.

Drifting is being proceeded with at the west end of No. 1 vein. The character of the vein is improving. All the ore taken out is good milling quality, averaging from 100 to 150 ounces to the ton. The mill is running night and day on the ore from Nos. 2 and 3 veins. Another shipment of high-grade smelting ore will be made in a few days. George W. Robinson, of New York, general manager and one of the principal owners of the mine, is now on a visit to the property. The Badger stock, the par value of which is $5, and one month ago sold at $6, cannot be purchased today at less than $22 per share, and there is very little of it to be purchased even at that figure.

Elgin Gold Mining Company, of St. Thomas.—This property is situated at the head of Jackfish Bay, Lake Superior. Some development work was done on it in 1885, the results of which I understand were quite satisfactory. Capt. I. H. Dickie commenced work there on the 4th inst. The Copper Cliff Mining Company, of Sudbury, Ont., is largely interested in the property. This property is within a short distance of the Mocan Valley gold location.

LAKE OF THE WOODS GOLD DISTRICT.

W. Roland, C. and M. E., has just returned, after making an examination of the Stewart gold locations, Nos. 250 P and 288 P. They are situated seven and a half miles east of Rat Portage, at Rossland Station, on the Canadian Pacific Railway, and comprise 220 acres, traversed by three strong veins. The general strike of the veins is northeast and southwest, and the country rock is of the Huronian series. He sunk test pits at intervals on these veins, and average samples taken from them gave the following result, on assays made by Chas. Brent, M. E. and Ch., Port Arthur: Sample No. 1, from bottom of test pit, 4·89 ounces gold to the ton; sample No. 2, from off the hanging wall, 5·52 ounces gold to the ton; sample No. 3, from most southerly test pit, 3·48 ounces gold to the ton; sample No. 4, from most northerly test pit, 6·92 ounces gold to the ton. Check assays of the above samples by Prof. Thos. Hayes, of Toronto, gave: Sample No. 1, from bottom of test pit, 4·65 ounces gold to the ton; sample No. 2, from hanging wall, 5·48 ounces gold to the ton; sample No. 3, from most southerly test pit, 3.42 ounces gold to the ton; sample No. 4, from most northerly test pit, 7 ounces gold to the ton.

Silver Islet Consolidated Mining and Land Company.—Capt. Thos. H. Tretheory commenced sinking a shaft on the new parallel vein, on Edward's Island, on the 13th inst. Some development work on the old vein shows it to carry an arsenical ore, giving assays from 150 to 700 ounces in silver; the new vein gives very good assays on the surface.

The property at Cape Gargantua has been resurveyed, and development work will shortly be commenced on the manganese vein, mentioned in these columns at the time of its discovery, about two months ago. The company proposes to explore the vein by means of a diamond drill, and also by sinking shafts at two or three points on it. The assays of this vein, made at the time of discovery by Chas. Brent, mining engineer and chemist, Port Arthur, were fully borne out by check assays made in New York for the company. H. S. Sibley is expected to arrive here on the 25th inst., accompanied by an expert from New York to examine and report upon some of the lands embracing an area of 108,000 acres, which are situated at different points between Pigeon River and Cape Maimase, on the north shore of Lake Superior.

West End Mining Company.—This property has been sold to Elias F. Drake of St. Paul, Minn., representing a syndicate, for $150.000 cash.

The property adjoins the Shuniah-Weachu on the west, and comprises 240 acres. There is a steam hoisting and pumping plant, and about twenty buildings, including the superintendent's residence, store, blacksmith's shop, boarding house, miner's dwellings, and ore house on the property.

The location is traversed by four veins, only one of which has been developed. The work was carried out under the superintendence of Mr. H. N. Nichols, a thoroughly practical mining man, from Denver, Colo. No. 1 is a true fissure vein, with an average width of six feet, and out-crops over half a mile on the property.

No. 1 shaft has been sunk to a depth of 225 feet on the vein; levels were driven east and west on the vein for a distance of 175 and 100 feet respectively at a point 75 feet from the surface. The second set of levels were started in 140 feet from the surface, and were driven east and west on the vein, a total distance of 75 and 50 feet respectively. No. 2 shaft is down 70 feet, and drifts have been run each way on the vein for 125 feet. No. 3 shaft is 50 feet. No. 4 is 15 feet deep. These workings are all on No. 1 vein, and are 650 feet apart. In addition to the above a cross-cut was run into the face of the bluff to intersect the vein, east of No. 2 shaft, and a drift 125 feet in length was driven east on the vein.

No stoping has been done, Mr. Nichols' object being to take out no ore except what was encountered in the course of development work; 15 tons of high grade smelting ore has been taken out, and about 2,000 tons of milling ore, 1,000 tons of which will average 100 ounces and the balance about 40 ounces to the ton. The silver is in the form of native and argentite, associated with highly argentiferous zinc blende. A large concentrating plant will be erected as soon as the railway reaches that point, which will be about December next.

EAST INDIA.

A New Tin Island in East India.—The Singkep Tin Company, of the Island of Singkep, has increased its capital to £125,000, to insure the regular working of tin mines. Singkep promises to become a formidable rival to its great tin producing neighbors, Banca and Blitong. Its size is about 123,550 acres, and it belongs to the Lingoa Islands, a group off the east coast of Sumatra, and formerly belonging to Johore and Malacca. The tin mines of Singkep are supposed to be of great antiquity. They were hitherto worked by the native sultan, who is a vassal of Holland. He exported the ore to Muntok, the capital of Banca, or to Singapore, but Singkep tin was not known by itself in the European market, being sold for Banca or Blitong.

MEXICO.

It is reported that Mr. Flavio Lobato, a well-known mining engineer and analytical chemist, has discovered platinum in some ores from the Las Yedras mines in the State of Sinaloa.

DIVIDENDS.

Daly Mining Company, dividend No. 42, of 25 cents per share, $37,500, payable August 30th at the office of Lounsbery & Co., Mills Building, New York City. Transfer books close August 25th and reopen August 31st.

Eureka Consolidated Mining Company, dividend No. 87, of 25 cents per share, $12,500, payable September 10th at the office of Laidlaw & Co., No. 14 Wall street, New York. Transfer books close September 2d and reopen September 11th.

Ontario Silver Mining Company, dividend No. 171 of 50 cents per share, $75,000, payable August 30th at the office of Lounsbery & Co., Mills Building, New York City. Transfer books close August 25th and reopen August 31st.

ASSESSMENTS.

Company.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Alliance, Utah		July 7	Aug 12	Sept. 1	.10
Barnes Sulphur, Utah		July 17	Aug. 25	Sept. 13	.02
Bona Fors, Cal.	1	June 19	Aug. 11	Sept. 5	.05
Con Imperial, Nev.	28	July 17	Aug. 20	Sept. 11	.05
Exchequer, Nev.	29	July 10	Aug. 14	Sept. 4	.25
Occidental	7	Aug. 5	Sept. 11	Oct. 7	.25
Peer	9	Aug. 7	Sept. 12	Oct. 3	.10
Union Con., Nev.	41	July 21	Aug. 26	Sept. 15	.25
Utah Con	10	Aug. 5	Sept. 15	Oct. 2	.25

MINING STOCKS.

For complete quotations of shares listed in New York Boston, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 235 and 236

New York, Friday Evening, Aug. 22.

A better feeling has been observed in the market for mining stocks during the week under review. The aggregate number of shares sold was greater than last week, and there has been more or less inquiry from outsiders. The brokers—who really are the most sanguine of human beings—are wearing smiling faces, and we have been requested to state that things are assuming a brisker aspect. The indications are that we may see a more active market within two or three months but whether we shall see the state of affairs so confidently expected by the hopeful brokers is another thing. It is well not to expect too great a boom for of a certainty those who think the days when the public was so absurdly gullible will return, will be disapointed.

Of the Colorado stocks Adams was quiet at $1.50. Chrysolite advanced from 25c. to 29c. Freeland was traded in to the extent of 1,800 shares at from 38c. to 40c. Iron silver returns to the Exchange this week, and shows sales aggregating 500 shares at $2.05. Leadville Consolidated shows fair-sized transactions at 12c.@13c. Little Chief advanced during the week from 33c. to 38c. The management of this company states that the lessees have sent two remittances this month, and that the royalties will probably amount to $2,000. Some rumors have been afloat to the effect that the company will take a more active interest in the actual development of the property. The president of the company assured a representative of the Engineering and Mining Journal that this report was unfounded, and that the management is well pleased with the work of the lessees. The company has about $9,000 on hand. Silver Cord shows a solitary transaction at 35c. Small Hopes was quiet at 90c.

Plymouth was traded in at $4, which is the lowest price at which this stock has been sold for several weeks past. Quicksilver, preferred, was steady at $42@$43, and common shows sales aggregating 1,800 shares at $8@$8.75. Standard was moderately traded in at 67@70c. Astoria was neglected at 4c. Sutter Creek, at $1.10@$1.20, was dealt in to the extent of 1,700 shares. Brunswick Consolidated shows sales of 18,000 shares at from 8@11c. This stock seems in favor with people who are fond of ups and downs.

Of the Comstocks, Alta advanced from $1.15@$1.25. Best & Belcher was neglected at $3@$3.30. Chollar was quiet at $2.60@$2.70, as was also Julia at 35@40c., and Mexican at $2.70@$3.25. Occidental was steady at 85@90c. Potosi was quiet at $6@$6.17. Utah advanced to $1.05, but declined, and at the close was selling at 85c. Consolidated California and Virginia opened at $3.75 and advanced to $4, at which price it was dealt in at the close. Crown Point was quiet at $2.50@$2.60. Gould & Curry was stationary at $2. Sierra Nevada had a solitary sale at $1.20.

Of the Tuscarora shares Commonwealth was traded in at $3, North Commonwealth at $2.50 and Nevada Queen at 70c. This is the first time for some weeks past that these stocks have been dealt in.

The copper stocks continue to be traded in. Atlantic had a solitary sale at $23.13. Calumet and Hecla was quiet at $301.13. Quincy advanced during the week from $126.88 to $130.75. Of Huron, 300 shares at $7.13 to $7.63, and of Tamarack, 13 shares at $207.75 were sold.

Among the Black Hills shares we note sales of Deadwood Terra at $1.35, and of Sullivan Consolidated at $1.

Horn Silver was in demand at from $3.50@$3.60. Ontario was quiet at $45.13@$45.50; Stormont shows a few transactions at 5c.

Mutual Smelting and Mining Company at $1.55 @$1.60 was traded in to the extent of 1,000 shares. Silver King was neglected at 65c.

Alice was firm at $2.70@$2.80.

Silver Mining of Lake Valley was quiet at 83@85c. Reference to this company will be found in our mining news column.

There was not much done in El Cristo at 80c. Of San Sebastian 800 shares were disposed of at 40@45c.

Phœnix of Arizona was sold at $1,05@$1,20 and

5,900 shares were disposed of. The management reports that the machinery at the property is running smoothly.

Boston.

Aug. 21.

(From our Special Correspondent.)

The market for copper stocks has shared in the general depression of the past week incident to tight money, and there has been more or less liquidation, especially in stocks bought on slight margins; and while there has been no great pressure to sell on the other hand there have been only limited orders to purchase and under the circumstances the wonder is that there has been no greater falling off in prices. The dividends paying stocks are all well held and have yielded but very little to the pressure for money. The prices of ingot copper is well maintained and will doubtless go higher before the year closes.

Allouez has held its own bravely against the adverse market, selling as high as $8 9½, and only losing ¼ on the decline.

Arnold sold at $1.85, same as last week.

Atlantic advanced to 23¾ in earlier dealings, declining to 22½ to-day as the lowest point.

Boston & Montana sold up to $60, but subsequently declined to $58. Butte advanced to 20½ but lost the advance in the later dealings, Calumet & Hecla after selling at $299 and dividend advanced to $305; one share selling at $307. The advance was lost to-day on orders to sell stock, and it sold down to $300. The report at the annual meeting yesterday was much fuller than usual, and is considered satisfactory to the stockholders.

Franklin has been unusually strong, and advanced, in spite of the money market, to 25½, losing only the fraction at the close.

Osceola has felt the depression, and doubtless owes its decline from $43 to $40¼ to reaching stop orders. Considerable stock is carried on margin, and generally by weak holders.

Centennial and Kearsarge have both been very weak. The former sold down to-day to $23½, which is about one-half for which it sold in May when the boom was on. Kearsarge declined to $18, which is also about the same ratio. Quincy advanced on good buying investment orders from $123 to $130, losing only a dollar on the latest sale. Tamarack shows a gain from $205 to $215, but sales to-day were at $210, and this was the bidding price at the close, The latest reports from the mine are very satisfactory, and there is good reason for the confidence which holders have in the future of this mine.

In the purely speculative list there has been very little doing. Huron sold at $7½; National is wanted at $2; none offered under $2½; Santa Fe declined from 65c.@52½c.; Washington sold at 30c. There were no sales of silver stocks at the board, but there is a good inquiry for Dunkin, Catalpa, Breece and Crescent, with very little disposition to sell them at present prices.

By Telegraph.—Centennial, $25; Butte and Boston, $20½; Osceola, $41½; Boston and Montana, $58¾; Kearsarge, $18; Allouez, $8½; Huron, $7½; Tamarack, $210; Calumet and Hecla, $300; Quincy, $126 bid.

Denver.

Prices and sales during the week ending August th, 1890;

Company.	Opening.	H.	L.	Closing.	S.
Alleghany, Colo	12b	13½	12	12½b	400
Amity, Colo	04½b	05¼b	04½	05¼b	1,300
Bangkok, C. B., Colo	12	*13	12	11¾b	9,700
Bates-Hunter, Colo	44b	46	44	45b	8,300
Brownlow, Colo	09b	9	08½	09b	7,0
Calliope, Colo	37b	38	37¾	37¾b	3,200
Cash	15b	15b	13	12b	200
Clay County, Colo	37b	*39	37	36¾b	2,300
Hard Money, Colo	05b	05	05	04¾b	2,0
Little Rule, Colo	4	61	54	61b	4,400
Matchless, Colo	200b	300b	150b	200b	.....
May-Mazeppa, Colo	62b	72	61	72b	6,200
Mollie Gibson, Colo	30a	50a	30b	30b	.....
Oro, Colo	200b	300b	150b	175b	.....
Pay Rock, Colo	06	06	06	06b	6,3 0
Puzzler, Colo	13½b	14½b	13¼	14¼b	200
Reed-National, Colo	66	68	66	68b	1,500
Running Lode	17	19b	15	19b	600
Silver Cord, Colo	20b	30a	20b	21b	.....
Whale, Colo	22b	25	25	22b	100
Prospects:					
Argonaut, Colo	21b	25½	24½	25¼b	6,000
Aspen United, Colo	05b	06b	05	06b	300
Big Indian, Colo	07	11	06½	11b	4,500
Big Six, Colo	05¼b	08¾	05	08¼b	7,500
Claudia J., Colo	09	10¼	09	10¼b	5,700
Nat. G. & Oil Co	17b	*27	17	24b	5,100
Diamond B., Colo	05	*05½	04¾	04¾b	22. 00
Emmons, Colo	23½b	*26½	24	24b	6,300
Golden Treasure, Colo	13¼b	16¼b	13¼	16b	900
Ironclad, Colo	20b	21	19½	19½b	1,100
John Jay, Colo	12¼b	16½b	12¼	16b	4,0 0
Justice	*15	15	14	13¼b	1,0 0
Legal Tender, Colo	04½b	04½	04½	04¾b	100
Morning Glim, Colo	45b	48	45	48b	2,700
Park Consolidated	†23	†23	†23	20½b	100
Potosi, Colo	09¼	*14	‡06¾	11½b	8,900
Rialto, Colo	16b	50b	16b	35b	.....
Total for the week					121,800

*Buyer 30 days. †Buyer 60 days. ‡Seller 30 days. a Asked. b Bid.

Chicago.

Aug. 19.

At a second meeting of prominent business men held at the Grand Pacific Hotel it was unanimously agreed that Chicago is to have a Mine and Metal Stock Exchange for the transfer of mining stocks, organized after the New York plan. F. A. Bishop, Esq., presided, with Mr. E. R. Neely, of the New York Consolidated Stock and Petroleum Exchange, as secretary. The object of the projectors is to make Chicago the acknowledged center of mining interests for the United States. Committees to draft articles of incorporation explaining the object of the new enterprise and to solicit memberships were appointed.

It is the intention of the projectors of this movement to create a market for metals, also for stocks of mining, smelting, and manufacturing companies. It was decided to offer the first 100 memberships at $100 each, after which to increase the price to $200, and to limit the membership to 500. A large number have already been taken. Subscriptions can be made at the office of F. A. Bishop, 626 Phœnix building. The only wonder is that such an institution, so obviously advantageous, was not established long ago. Chicago is the only city of any importance to-day without a mining exchange.

The probable effect of this exchange will be to center and consolidate the iron, tin, copper, zinc, coal and the various metal industries, to bring together those interested in the same, stimulating trade and shipments. Mine operators will naturally, it is claimed, send their products to commission houses here to be disposed of. It is expected also that it will do for Chicago in the line of metals just about that which the Board of Trade has done in the line of agricultural products. Interest in this matter is by no means entirely a local one; New York, Boston, Denver and other cities are actively interested in its success.

Kansas City.

Aug. 19.

Company.	Opening.	H.	L.	Closing.	Sales.
Argonaut	23†	27*	23†	27*	1,100
Bates-Hunter	4 1½	46	44½	45	7,100
Big Six	8†	10*	8†	10*	200
Brownlow	30	....	....	....	....
Cash Gold	18*	18½‖	18*	18½*	3 300
Clay County	42‖	42½‖	35	35	4,000
Diamond B	4¾	7‖	1½	4¾	8,200
Hard Money	12‡	....	....	....	....
Hunki Dori	16‖	16½‖	16‖	16‖	1,700
Iron Clad	19*†	....	....	....	....
Kansas City M. & M. Co	2.67½	2.70	2 60	2 70	500
King Jack	40‡	....	....	....	....
Little Nugget	59	58§	58½	59½	1,700
Little Rule	60	60½	60	60½	600
May Mazeppa	72½	76*	71	71½	11,800
Minnequa Zinc M. Co	28*	32‖	26½	27	5,200
Monte Cristo	5§	8*	5§	8*	700
Morning Glim	47½	47½	47	47	1,400
Pay Rock	6†	9‡	....	....	....
Pelican	22½	25*	22½	25*	2,100
Potosi	11†	....	....	....	.....
Running Lode	18†	19‡	....	....	....
Sylph	15†	16§	15†	16§	200
Total					49,800
Pit sales					.....

†Bid. ‡Asked. * Buyer 30. § Seller 30. ‖ Buyer 60.

Minneapolis.

August 19.

Company.	Bid.	Asked.
Algoma	.30	$1.00
Aurora I. M. Co	7.50	....
Badger Silver Mg. Co	5.00	10.00
Black Hills Tin M. Co	....	1.50
Canada G. Mg. Co	20	.50
Carbonate Hill Mg. Co	.50	1.00
Clingstone L. Mg. Co	....	....
Crescent I. Mg. Co	1.00	....
Deer Lodge Mg. & Sm. Co	....	....
Derwood Con. Mg. & M. Co	....	....
Dot Iron Mg. Co	....	....
El Dorado I. Mg. Co	....	1.00
Fairview S. Mg. Co	....	.50
Glengary S. Mg. Co., Mont	....	....
Gogebic Iron Co	....	....
Iron Duke Mg. Co	1.00	1.50
Kakabeka Mg. Co	.25	1.00
Keystone Mg. Co	.20	1.00
La Belle I. Mg. Co	1.00	1.50
Marquette Iron Synd.	....	3.50
Minnehaha M. Co	....	2.00
North Pabst I. Mg. Co	....	....
N. W. Coal Mg. Co	3.25	3.75
Stengle L. & M. Co	1.00	1 50
Thunder Bay G. & S. M Co	.75	1.00
White Spar Mica Mg. Co	1.75	2.00

Salt Lake City.

July 31.

Company.	Opening.	Highest.	Lowest.	Closing.	Sales.
Alice, Mont	2 60 b	2 60 b	2.60 b	2.60 b	.....
Anchor, Utah	....	....	....	....	....
Alliance, Utah	2.00 a	2.00 a	2.00 a	2.00 a	....
Apex, Utah	.18 b	.19 b	.18 b	.19 b	4,350
Barnes, Utah	.12½ b	.17 a	.12½ b	.12½ b	....
Crescent, Utah	.33 a	.33 a	.32 a	32 a	....
Cent.-Eureka, Ut.	22.00 b	22.50 b	22.00 b	22.50 b	....
Congo	.12 b	12½ b	.12½ b	.12½ b	1,000
Daly, Utah	22.00 b	22.00 b	22.00 b	22.00 b	....
Glencoe, Utah	3.00 a	3.00 a	1.50 a	1.50 a	....
Horn Silver, Utah	....	....	....	....	....
King of West, Id	....	....	....	....	....
Mammoth, Utah	3.75 b	4.50 a	3.75 b	3.75 b	....
Malad Con., Id	.12½ a	.12½ a	.10 a	.10 a	....
Northern Spy	....	....	....	....	....
Ontario, Utah	....	....	....	....	....
Stanley	....	....	....	....	....
Utah L. & C. Co.	8.00 b	8.20 b	8.00 b	8.20 b	....
Utah Oil Co., Utah	.34 b	.34b	.34 b	.34 b	1,000
Woodside, Utah	....	....	....	....	....
Total					6,350

*Buyer, 30 days. †Seller, 30 days. ‡Assessment paid a Asked, b bid.

Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co	$25.00	$55.00	$58.00
Aurora Iron Co	25 00	8.00	8.50
Champion Iron Co	25 00	.	90.00
Chandler Iron Co	25.00	38.00	40.00
Chapin Iron Mining Co	25.00	30.00	33.00
Chicago & Minn. Ore Co	100.00	115 00	118 00
Cleveland Iron Co	25.00	18.00	18.50
Germania	25.00	11.50	12.00
Jackson Iron Co	25 00	110.00	.....
Lake Superior Iron Co	25 00	70.00	75.00
Milwaukee Iron Co	25.00	5.50	6.50
Minnesota Iron Co	100.00	84.00	86.00
Montreal Iron Co	25.00	8.00	9.00
Norrie (Metropolitan)	25.00	75.00	82.00
Odanah Iron Co	25.00	*16.50	22 00
Pittsburg Lake Angeline Co.	25.00	175.00	180.00
Republic Iron Co	25.00	42.50	43.50

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	High.
Gold Lake Mg. Co	....	....	....
Grayling Gold & Silver Co	$25.00	....	....
Michigan Gold Co	25.00	$1.25	1.50
Peninsula Gold & Silver Co	25.00	.50	....
Ropes Gold & Silver Co	25.00	2.25	2.50

* Actual sales were made at this price.

St. Louis.

Aug. 20.

(From our Special Correspondent.)

Although trading this week has improved slightly over that of last week, it is nothing to boast of. Wheat speculating seems to have taken all the interest of the brokers and little attention is given to mining matters. Central Silver, Tourtelotte and Pat Murphy were the points of attraction this week and sold fairly well.

The bi-metallic weekly shipment amounted to 23 bars, containing 27,045 ounces of silver and 22 ounces of gold.

Twenty-four bars made up the regular weekly shipment of the Granite Mountain. They contained 34,600 ounces of silver and 88 ounces of gold.

The Yuma Copper Mine directors have decided to sell but $30,000 of their late issue of bonds. All the amount has been taken by the stockholders. This decision was reached when it was found how near the smelter the new well was. The water being so near, it is expected to make the property pay its expenses.

Granite Mountain had a private sale of twenty-five (25) shares at $46.50.

Cœur d'Alene has been taken from Call.

On Saturday the Board of Directors of the Montrose Placer Mining Company held a meeting, and elected O. A. Haynes, president; W. H. Hallett, vice-president, and E. H. Hill, secretary.

Little Albert sold this week at 42½.

A feature in this week's markets was the rise in Richmond Hill. Another surprise was the leap of Montrose Placer from 47½ to 72½.

Prices and sales for the week ending August 0th:

Company.	Opening.	H.	L.	Closing.	Sales.
Adams	$1.15	....	....	1.60	....
American & Nettie	1.75	1.77½	1.70	1.70	300
Bi metallic	32.50	....	....	32.50	.....
Central Silver	.18¾	.18¾	.15	.16¼	5,300
Granite Mountain	46.00	46.50	45 50	46.00	25
Gold King	.03	....	.02½	.04	.....
La Union	.09½	.09½	.07	.08½	400
Little Albert	.42½	....	....	.37½	300
Mickey Breen	1.17½	....	....	1.05	200
Major Budd	.11	12	.11	.11½	100
Montrose Placer	.47½	.72½	.47½	.68¾	.....
Mountain Key	.50	....	.47½	.50	.....
Mexican Improvement	.15	....	.14½	.14½	.....
Pat Murphy	.15	.16¼	.14	.14	4,500
Richmond Hill	.15	.25	....	....	1,000
Small Hopes	.45	.80	.45	.80	.....
Silver Age	1.47½	.50	..	1.47½	100
Tourtelotte	.05	.05	.03	.04	5,7 0
Yuma	.58¾	.60	....	.58¾	500
Total					18,425

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. Watson & Gibson.)

Dealings were begun early Monday morning on all the exchanges in Buckeye (Ohio) oil certificates, and for two or three days there was considerable excitement and interest in the market, but the business in this Lima oil began at rather an unfortunate time, for the stock market was declining rapidly, while the rates on money were advancing rapidly. The price of Lima oil started at between 40 and 42 cents in the different exchanges, breaking down to 34, and now stands between 35 and 36 cents. The commodity looks cheap at these prices, and we are inclined to advise the purchase of Ohio oil at about the present figures. The break in Ohio oil was accompanied by a break of about 5 cents in the price of Pennsylvania oil on very light transactions. We are also inclined to regard it as a purchase.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Aug. 16	92	92	91⅛	91⅛	27,000
18	91¾	91⅞	91¾	91⅞	18,000
19	92	92	90⅞	90¾	40,000
20	90	90	87¾	87⅞	71,000
21	87	87	85⅛	85⅛	13,000
22	85	86	85	85⅜	37.000
Total sales in barrels					206,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Aug. 16.....	93⅜	93⅜	91¾	93	52,000
18.....	93	93	92	92⅛	26,000
19.....	92¼	92¼	91⅛	91⅛	18,000
20.....	91	91	88	88	71,000
21.....	87⅛	87⅝	85⅝	85½	64, 0
22.....	85⅞	87¼	85	85	177,000
Total sales in barrels.....					408,000

COAL TRADE REVIEW.

Statistics.

NEW YORK, Friday Evening, August 22.

Mr. John H. Jones, chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of shipments of anthracite coal (approximated) for the week ending August 16th, 1890, compared with the same period last year:

Regions.	Aug. 16, 1890.	Aug. 17, 1889.	Difference.	
Wyoming Region Tons	413,717	411,605	Inc.	2,112
Lehigh Region ... "	129,302	133,666	Dec.	4,364
Schuylkill Region. "	189,344	234,463	Dec.	45,119
Total.....	732,363	779,734	Dec.	47,371
Total for year to date..	20,411,371	20,741,560	Dec.	330,189

PRODUCTION OF BITUMINOUS COAL for week ending August 16th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R.R.....	2,487	82,908	43,016
Cumberland, Md.....	84,741	2,322,124	1,895,662
Barclay, Pa	*3,065	93,282	71,721
Broad Top, Pa.....	6,096	316,333	198,229
Clearfield, Pa.....	68,066	2,387,750	1,903,349
Allegheny, Pa.....	23,801	827,708	478,568
Beach Creek, Pa.....	34,816	1,174,042	914,061
Pocahontas Flat Top.....	35,324	1,194,487	1,066,976
Kanawha, W. Va.....	*35,271	1,264,745	1,070,430
Total....	293,667	9,663,379	7,642,012

* Estimated.

WESTERN SHIPMENTS.

Pittsburgh, Pa.....	12,651	529,550	380,831
Westmoreland, Pa	10,608	786,205	874,121
Monongahela, Pa.....	13,893	300,095	248,148
Total	37,152	1,615,850	1,503,100
Grand Total.....	330,819	11,279,229	9,145,112

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending August 16th, and year from January 1st, in tons of 2,000 lbs.: Week, 97,180 tons; year, 3,337,004 tons; to corresponding date in 1889, 2,678,538.

Anthracite.

The market is exceedingly flat. It has for some weeks been expected that the middle of August would find the consumer depleting the stocks of the retailer, the retailer drawing on the middlemen, and the middlemen pushing the operators to keep up with the demand. This expectation was based on the statistical history of the month of August. Now that three-fourths of the month have passed, operators are asking the middlemen where the retailers are, and they in turn have been awaiting the consumer. But the consumer, in the light of the last two mild winters, seems to have faith that a third mild winter will follow the other two.

Nevertheless, while stocks in the retail coal yards continue large, the increase in volume is stopping, and there are signs that at last the consumer is beginning to look winterwards. But trade is not by any means as brisk as it should be in the fourth week of August. Instead of an increased output next month, with an increase in prices, there is every indication of a continuation of present figures. In view of these facts, unless an unusually severe winter is indicated at an early date, the output required by the market will scarcely amount to 36,000,000 tons for the year.

The market is certainly no stronger than it was last week, though there is an outward semblance of living up to the scale all around. The circular prices remain: Stove, $4; egg, $3.75; broken and chestnut, $3.65. Pea and buckwheat continue at the weakest possible point: Clear, free-burning pea, $2.50 f.o.b., with possibly a shading here and there, and lower qualities 30 cents to 35 cents less Buckwheat can be bought in large quantities below the quoted price, $1.70.

Bituminous.

The soft coal market is living on contract supply, and operators are willing to listen to offers below the scale for orders. But no new business is presenting itself just now. Stocks are generally larger than are required to make a strong market, though some complain that the labor troubles have so diverted ordinary commercial freight that slow deliveries have hampered them. Certain it is that soft coal can be bought in quantities at a very respectable cut from agreed rates, with sellers eagerly gunning for buyers.

The labor troubles in Cambria, Clearfield and Jefferson Counties seem to be adjusting themselves. The miners are all at work at the old scale. They have called a convention for the last of the month, at which they have invited the operators to be present. The convention between the operators and miners is intended to be one with ends politic rather than financial. No new scales of prices or regulations as to hours are to be presented, and the main question to be discussed is a method of isolating mines or districts in the event of strikes. If an agreement is reached it will be that in the event of a strike in one mine the other operators will give neither comfort nor assistance. The men are willing to concede certain disputed points to gain this end. The importance of this move is evidenced by the strike now in progress in Westmoreland County at the mines of the Westmoreland & Pennsylvania Gas Company. Here none of the old miners have yet returned to work, yet the operators continue to fulfill their contracts. They are drawing supplies from Virginia, and the strikers are said to be working to shut off this source of supply, or to make trouble in Virginia.

The continuance of the strike in Wales will in a short time begin to have its effect on stocks in the West Indies, Central and South America. Coal is being shipped largely from Newcastle to supply the deficiency, and American operators ask nothing better. The Newcastle coal is inferior both to Cardiff coal and to American soft coal. Hence the expectation that if the strike continues a few weeks longer our bituminous coal will find markets where it has hitherto been excluded.

Freights continue about the same as last week, with vessels plentiful. Prices are nominally: At Baltimore, $2.40@$2.50 f. o. b.; Philadelphia, $2.50 @$2.60; in New York harbor, $3.25; alongside; $3.50.

Boston. Aug. 21.

[From Our Special Correspondent.]

The anthracite coal market has improved in tone, and is in noticeably better shape than last week, or indeed for some little time past. Business is still light, but the market is not demoralized by extreme weakness of sellers. Not only the company agents, but individuals, are insisting upon higher prices. Stove coal is now held at $3.75@$4 f. o. b. at New York. Some concession might be made to middlemen from this price, but the days of $2.50@$3.60 for stove coal seem to have gone by. Egg coal is relatively scarce, and rules from $3.60 to $3.75. Free egg is in quite short supply. Broken sizes are quoted from $3.50 to $3.60. Lehigh broken commands $3.85 and egg $4. It is understood that companies will stop cutting prices. Certainly they have done so for the time being. Offers have been declined this week which would have been accepted two weeks ago, if not at a more recent date.

The bituminous market is unchanged as to prices but Cumberland coal is beginning to come along more slowly, and this accounts in part for the exceedingly low freights at Baltimore. There is some fear lest the hard experience of last season in getting Cumberland coal to tide is to be repeated.

Freights are lower than ever. Charters from New York are reported at 50 cents, which is about the lowest rate to Boston on record. Small vessels command 55@60 cents. The Philadelphia rate is down to 75@80 cents and the Baltimore rate to $1. The railroad troubles in New York have considerably interfered with all-rail deliveries, and there is a good deal of apprehension of further and more serious trouble. The Scranton Company was reported to-day as refusing orders until the Knights of Labor rumpus was settled; much interest is felt in the New York Central labor difficulties.

Retail trade is a little better. Prices remain $5.75 for broken and egg and $5.50 for stove, and are not being cut seriously. A large buyer could probably shade these figures 25 cents. Retailers are not making a bad business of it at present prices, and will have a fair season if they will let each other's trade alone.

Buffalo. Aug. 21.

(From our Special Correspondent.)

The strike and incidents connected therewith are the all absorbing topics of the hour and day. The delays and inconveniences in handling freight are, to say the least, annoying, and if continued much longer will seriously embarrass trade. Several of the package lines of propellers and barges have taken coal for up freight in consequence of the shortage of goods usually received by railroad.

The coal trade is very dull, and drags along in an uninteresting manner. Quotations unchanged. Bituminous is strong and held firm. Personal observation showed yesterday that all the lines centering at East Buffalo have their tracks covered with loaded coal cars, and no movement was apparently being made to handle them.

Until yesterday there was but little doing in coal freights by lake, the largest transaction being the loading of several vessels for Milwaukee; but since propeller lines are taking coal, as package freight is light in consequence of the New York Central strike, vessel brokers will not charter ahead of arrivals of craft more than two or three days. Lake freights are steady. The shipments from this port from August 14th to 20th, both days inclusive, were 42,200 net tons, distributed as follows: 14,040 to Chicago, 12,190 to Milwaukee, 2,200 to Duluth, 8,900 to Superior, 1,610 to Toledo, 400 to Saginaw, 600 to Port Huron, 660 to Detroit, 600 to Ludington, 200 to Bay City, 250 to Au Sable, 50 to Cheboygan, and 500 to Gladstone; total thus far this season, 976,950 net tons.

The rates of freight were 60c. to Chicago, 50c. to Green Bay and Milwaukee, 40c. to Duluth and Superior, 70c. to Ludington, 30c. to Toledo, Detroit and Sheboygan, 25c. to Au Sable, and 40c. to Port Huron, Saginaw and Gladstone.

Canal movements of coal for the second week in August: Receipts, 305 net tons; shipments, 458 net tons. For the third week in August: Receipts, 4,013 net tons; shipments, 954 net tons. No charters reported.

Chicago. Aug. 20.

(From our Special Correspondent.)

Greater activity may be looked for from now on in the Chicago coal market; increased sales are reported from the jobbing trade, and a brighter outlook is noted. Buying has already vigorously commenced. The advance of 25 cents per ton goes into effect September 1st. We gather from some sources that the advance is likely to be made 50 cents. It is reported that this market is 75,000 tons short in its supply. Bituminous mines are all running full; orders are large and numerous. There is still much complaint as to poor car service. Prices are stiffening up. For coke there is a good run of business and an increasing demand; prices are firm.

We continue to quote retail prices for anthracite at: Large egg, $5.75; small egg, range and chestnut, $6.

On cars, f. o. b. Chicago: grate, $5; stove, range and chestnut, $5.25; Lehigh, lump, $7.

The figures for bituminous are as yet unchanged.

They are, per ton of 2,000 pounds: Green and Sullivan County (Ind.), shaft, $2.25@$2.40; Jackson Hill, $3.25; Hocking Valley, $3; Ohio Central, $3; Erie, Briar Hill, $4.15@$4.2 ; Indiana Block, $2.35; Youghiogheny, $3 35; Sunday Creek, $3.

Prices for coke remain also unchanged. Seventy-two-hour Connellsville, $5.20; crushed (domestic), $4@$4.25; Elk Lick, $4.25@$4.50.

Pittsburg. Aug. 21.

(From our Special Correspondent.)

Coal.—The market remains steady, with a fair trade demand. The last shipment by the Ohio River was in June. The lower markets are reported firm, with an improved demand. Shipments by rail are well up to the average. In the Monongahela parts there is very little mining going on. As the fall draws near the local trade will increase.

Nominal rates in pools:

Per 100 bushels.		Per 100 bushels.	
1st pool	$4.75	3d pool.....	$3.90
2d pool.....	4.50	4th pool	3.25

Railroad coal, $5.00@$5.50.

Connellsville Coke.—Dealers report a fair trade with a slight falling off in shipments. The works continue to run five or six days. Cars are again reported scarce. The number of active ovens in the region are estimated at 12,300, and those inactive 2,850. Production about equal to the demand. Shipments exceed 1,000 cars per day. To points west of Pittsburg, 3,700; east, 1,300; to Pittsburg, 1,200.

The rates were for 2,000 pounds f.o.b. cars at ovens. Blast furnace coke, $2.15; foundry coke, $2.45; crushed coke, $2.65.

Freights to Pittsburg 70c. per ton; Mahoning and Shenango Valleys, $1.35; St. Louis, $3.35; Cleveland, $1.70; Chicago, $2.75.

METAL MARKET.

NEW YORK, Friday Evening, Aug. 22.

The United States assay office at New York reports total receipts of silver for the week to be 180,000 ounces.

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

	Price. H.	Price. L.	Sales.
Aug. 16..	117¼	116⅛	771,000
Aug. 18.....	120¾	117¼	1,892,000
Aug. 19.....	121	119	1,613,000
Aug. 20	120¾	119⅛	795,000
Aug. 21.....	119¾	117¾	635,000
Aug. 22.....	119¾	118¼	410,000
Total sales.....			6,116,00

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday reduced its rates for discount from 5 to 4 per cent. During the week the bank gained £566,000 bullion, and the proportion of its reserve to its liabilities was raised from 41·93 to 43·70 per cent., against an advance of 37·17 per cent. in the same week of last year, when its rate for discount was 3 per cent. On the 21st inst. the bank gained £16,000 bullion on balance. The weekly statement of the Bank of France shows a gain of 1,550,000 francs gold and 1,925,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	$ .92	$ .95
Mexican dollars	.92	.95
Peruvian soles and Chilian pesos	.84	.87
English silver	4.86	4.90
Five francs	.94	.95
Victoria sovereigns	4.86	4.93
Twenty francs	3.86	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.78	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	1.19⅛	1.21

Copper.—In the earlier part of the week the whole market was rather dull, but later on a decidedly better feeling became manifest. This improvement was doubtless due to the fact that more orders are understood to have been received by manufacturers. This applies more particularly to wire makers, and the demand for wire bars is in consequence unabated, but it also applies to a certain extent to manufacturers of brass, the demand for which is better than previously. Rumors have been current that some business has lately been done in lake copper for report on the basis of 17½c., but of this we have been unable to obtain any confirmation. The quotation for lake copper remains as before at 17c., with Arizona copper at 15¼-½c., and casting brand at 14⅝-¾c.

European cable advices report a decrease of 1,600 tons in the statistics of visible supplies for the first half of August and a further considerable decrease is anticipated for the second half of the month.

The London market for Chili bars and J. M. B. copper has displayed a good deal of animation during the week. At the close of last week the quotations stood at £58 5s, to £58 7s. 6d. spot, and £58 10s. to £58 12s. 6d. three months. On Monday morning the market opened at £58 10s.@£58 12s. 6d. spot and £58 17s. 6d.@£59 three months, and after gradually improving all the week the last quotations received by cable to-day are at the highest figures, viz.: £59 12s. 6d. to £59'15s. spot, and £59 17s. 6d. to £60 three months. Advices from Europe are that a very large business has been done, and the buying orders from India have been unusually heavy. The following are the latest quotations for refined and manufactured sorts, viz.: Best selected, £64.10@£65; India sheets, £66@£67; English Tough, £61.10@£62, and yellow metal, 6¼d.

Tin.—The important rise in silver values has at last produced a marked effect in the market for tin. In the upward movement the London market has taken the lead, but the market on this side has readily responded, and a rapid advance in prices has ensued. Last week the closing quotations stood at about 21⅛, but to-day we close with buyers at 21·50 for August as well as for later deliveries. Without doubt the quantity of spot tin here is exceedingly small, and dealers are to a very large extent dependent on incoming steamers for their current supplies. In London a very large business has been doing from day to day, and the latest quotations received by cable to day, viz.: £96 10s.@£96 12s. 6d. spot and £97 2s. 6d.@£97 5s. three months mark an advance of nearly £3 for the week.

Lead.—The improvement reported in our last has become more marked during the week just past and the scarcity of the metal has increased, the fact being that had it not been for the release of some of the replevined lead long tied up by litigation, there would have been an actual dearth of supplies. This scarcity is likely to continue because most of the western smelters are entirely sold out for August and September and the few who have anything unsold for September decline to quote; $4.65 is readily obtainable for round lots, and carload lots cannot now be bought below $467½@$4.70. The lead market is certainly in a very sound position, and with the consumptive demand now in its most active season it is likely that values will further harden.

The St. Louis Lead Market.—Messrs. John Wahl & Co. telegraph us as follows: "Lead has ruled strong since our last report. The metal appears to have many friends, and both speculators and consumers have bought freely. Prices have advanced from $4.40 to $4.50 nominally. At the close the metal has both buyers and sellers at $4.47½. Sales will probably aggregate 1,000 tons. We are rather inclined to believe that lead has seen its highest stage, at least for the present."

Spelter is also in much better demand, with very little spot metal offering. We have now to quote $5.55 to $5.60.

Antimony is unchanged with Cooksons at 23½@24; L. X., 21@21¼, and Halletts, 20@20¼.

Nickel is firm at 80c. to 85c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, August 22.

In the New York iron market there has been little, if any, variation during the past week from the condition prevailing during the past six weeks. Trade generally continues dull and firm, with a small demand and a supply just about sufficient to meet it. All business done is of the hand-to-mouth sort. Dealers as a rule look forward hopefully, and appear to expect that the boom in silver will result in increased values of all mercantile commodities, but more especially in all classes of iron and steel and their manufactured products. The tendency to higher prices in foreign markets has had no appreciable effect here as yet, but if it continues it must intensify to the feeling of security in this market.

American Pig Iron.—No transactions of any note have been effected during the past week. No. 1 Southern appears to be scarce, and though it is quoted at anywhere from $17 to $18, it is safe to say that those who control any considerable quantity of it will not entertain any offers at the lower figure. No. 2 remains at $16.50@$17; Northern, No. 1, $18@$18.50; No. 2, $17@$17.50.

Scotch Pig Iron.—There seems to be no demand for Scotch pig iron at present, and the fact that it has advanced during the week from 75 cents to $1 a ton is hardly calculated to stimulate its importation. The increase in the price of coal in England about 50 per cent., mainly through labor troubles, has led to the increase in the price of Scotch pig, and has resulted in the dampening down of three furnaces in England during the past 10 days. No. 1 Coltness may be quoted at $24@$24.50; Dalmellington, $21@$21.50; Eglinton, $20.25@20.75.

Spiegeleisen and Ferro-manganese.—One transaction of 2,000 tons of 20 per cent. German spiegeleisen at 25 ·. below our lowest quotation is reported, but it is not believed that any one would duplicate it at the same figure. For German we quote $30.25@$30.75, and for English $1 a ton higher. For 80 per cent. ferro-manganese the demand is quiet and holders firm, prices being $73.75@74.50.

Steel Rails.—The Board of Control reports sales of 1,273,440 tons up to August 1st, which leaves 326,560 of the allotment, which it is scarcely expected at the mills will be exhausted during the current year. Several large orders from the South are spoken of, but prices are not divulged. The feeling is, however, that the price which has nominally prevailed for some time—$31—has been shaded. Most of the rumors of sales indicate active buyers for Southern delivery, but, as we stated last week, they are not authenticated.

Rail Fastenings.—The trade seems very skeptical about the rumored resuscitation of the defunct spikemakers' association. There is not a gleam of relief in the dullness of the past few weeks. Prices are quoted as follows: Spikes, 2c.; angle plates, 1·75@1·80c.; bolts and square nuts, 2·70c.; hexagonal nuts, 2·95@3c.; complete joint, iron and steel, according to weight.

Tubes and Pipes.—Business is fairly brisk, considering the season. Ruling discounts on car lots: 47½ per cent. on butt, black; 40 on galvanized; 60 on lap, black, and 47¼ on lap, galvanized; 40 on 1¾-inch boilers; 50 for 2 to 4-inch. and 52½ on larger than 4-inch casing, all sizes, 50 per cent.

Merchant Steel.—Prices remain the same, with next to nothing doing. Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2¾c.; open-hearth spring, 2¾c.; tire steel, 2¾c.; toe calks, 2¾c.; flat file, 4¾c.; mill file, 5¼c.; taper file, 7¼c.; first quality sheet, 10c.; second quality sheet, 8c.

Old Rails.—The supply is away behind the demand for old rails, and all those which were held for $25 are disposed of. Nothing less than $26 will secure any considerable quantity now. One block of 1,000 tons was sold during the week at $26 per ton, to arrive. Occasional quotations of $25.25@$25.50 are given, but not by parties who have any option on stock, which is so scarce that buyers would eagerly snap up all they could get at these figures.

Structural Iron and Steel.—This continues the busiest branch of the iron trade, though the week has resulted in nothing noteworthy. The demand for experienced draughtsmen just now indicates preparations for several large contracts which are under way. Prices are: Universal plates, 2·20@2·28c.; bridge plates, 2·15@2·20c.; angles, 2·10@2·15c.; tees, 2·65c.; beams, 3·10c.

Scrap Iron.—This market is so dull and variable as to price that it is hardly worth quoting. One dealer who had several hundred tons this week was obliged to store the iron in a yard, as there is no demand.

Chicago. Aug. 20.

(From our Special Correspondent).

Although the continued summer dullness might be said to characterize the Chicago iron market, the conditions of the same for both crude and finished products promise well for the future. Manufactured irons are rapidly coming to the front in demand, which must necessitate an increase of crude production; in the South several new stacks are about to be blown in, but as their output has already been anticipated, no overstock is looked for, and they will have no effect on this market. The firmness of Southern irons reported last week continues; the high figures quoted for standard brands rule most of them out of the present market; they look for higher figures in the near future.

Never in the history of the pig iron trade have prospects been brighter than at present, as viewed from this point. Most of the Lake Superior charcoal furnaces are well sold up, as is also the case with cokes; the demand, although mostly for small amounts, is fully up to the average at this season. Ohio softeners are in good demand for small lots; many furnaces refuse to dispose of the heavier portion of their product. It is reported that the long abandoned charcoal furnaces, once known as the Nontum furnace, at Chocolay, near Marquette, Mich., is being rapidly reconstructed and will begin active operations soon; the owners expect to turn out about sixty tons of pig daily.

Pig Iron.—Production and consumption have been quite evenly balanced during the past week, and the absence of accumulations tend to maintain a general steadiness in the market. The demand has been for moderate quantities, but a change in the tone of the market, with an increased volume of business, is expected soon. September, it is believed, will show a better list of quotations that is current now. No concessions whatever are anticipated. Many large consumers have covered their needs for the present. Still great firmness is characteristic here, and nowhere do we hear of cut rates. The foundry trade generally is in good shape and many are compelled to decline new orders. We quote to-day for cash per ton of 2,240 pounds, f.o.b. Chicago, for Nos. 1 and 2, Lake Superior charcoal No. 3, for car wheels, Nos. 4 and 5 for malleable, $20.50@$21; Lake Superior coke Bessemer, $18.50; Lake Superior coke Bay View No. 1, $17@$17.50; No. 2, $16@$16.50; No. 3, $15.50@$16; Southern coke No. 1, $16.50@$17; No. 2, $15.50@$16; No. 3, $15@$15.50. Southern charcoal, $19@$19.50; standard Southern car wheel, $24@25; Ohio softeners, Hanging Rock, $18.50@$19; Jackson County, $18@$19; Hanging Rock cold blast, $26@$28; warm blast, $23@$25; No. 1 Scotch, according to brands, $26@$27; American Scotch, $19@$20; Bay View Scotch No. 1, $17; No. 2, $16; Chicago Scotch No. 1, $17; No. 2, $16; Emma Scotch, $19@$19.50; Black band, Hubbard Scotch, $19.50; Haselton, $20.25; soft Silvery, $18; Wellston No. 1, $19; No. 2, $18.50@$19; Hamilton No. 1, $18; Norton No. 1, $17.75@$18.25; Zanesville No. 1, $18.75@$19.25.

Structural Iron.—The heavy demand for structurals, as expected, continues, and values of all classes are firmly held up. The volume of business is enormous. Prices are likely to advance soon. We quote: angles, iron and steel, in car lots, f. o. b. Chicago, $2.30@$2.40; universal plates, $2.55; sheared plates, $2.50; tees, $2.70@$2.80; beams and channels, $3.20. Store prices are: angles, $2.50@$2.60; tees, $2.80; beams and channels, $3.70.

It is reported that a company with a capital stock of $5,000,000 has been organized in this city for manufacturing structural iron. Fifteen hundred men are to be employed. An enterprise of this kind has become one of the necessities of Chicago.

Bar Iron.—Trade continues active, and quotations are firmly maintained. Mill agents are not seeking orders at $1.70, no matter how gilt-edged the specification may be. Many are getting $1.75@$1.78 for specials. The average figures at which contracts are now placed are $1.85@$1.88 f. o. b. Chicago quotations from stores are strong at $2.10@$2.20; rates with extras according to quality and quantity.

Black Sheet Iron is in good demand for the lighter gauges, and there are plenty of inquiries for mill lots still, notwithstanding the subdued demand reported last week; prices fairly maintained. Quotations are $3.10 f. o. b. mill for No. 27. Store prices are $3.20 for No. 24, $3.30 for Nos. 25 and 26, and $3.40 for No. 27. Smooth sheets at stores have advanced60 cents per hundred weight.

Galvanized Sheet Iron.—A fair business is noted. The prevalent demand tends to maintain the recent advance in discounts, which, for both cheap and standard brands, are now 62½ per cent. on Juniata and 62½ and 5 per cent. on charcoal from store. Jobbing lots are quoted according to quantities.

Merchant Steel—Demand continues excellent for small lots, and values are steady at the late advanced figures. Orders during the past week, though comparatively small, aggregate a large tonnage. Buyers and sellers realize now that prices must go higher. Good steel is in fair request from dealers. We quote: Tool steel, $7.75@$8; specials, $12 and upward; open-hearth machinery, $3; Bessemer machinery, $2.50@$2.60; open-hearth spring steel, $2.60@$2.65; tire, $2.50@2.60; toe calk, $2.70@$2.80; sleigh shoe, $2.40@$2.50; cutter shoe (T. & B.), $2.65@$2.70; crucible sheet steel, $7@$10; crucible spring, $3.75.

Plates, Tubes, etc.—Mill agents say the business of July in this direction was the largest known to the trade; and if the demand for the balance of the present month continues as it has begun, August will rival that of July. Tubes are very scarce, and sizes badly broken. Mills do not promise deliveries on new business until November.

We quote as follows: tank iron, $2.70; tank steel, $2.90; heavy sheets from 10 to 14, $2.90@$3; steel sheets 10 to 14, $3.25@$3.50; shell iron, $3@$3.25; flange iron, $4@$4.25; flange steel, $3.50; shell

steel, $3.25; boiler rivets, $4@$4.25; fire box iron and steel, $4.75@$5.50; boiler tubes 4½ inches and larger, 52½ per cent.; 2 to 4 inches, 50 per cent., and 1¼ inches and smaller, 45 per cent.

Nails.—Both steel and wire nails continue in good demand, and prices are held very firm; orders are plentiful from the jobbing trade. Some of the heavier buyers are showing their confidence in the stability of the market by the large orders placed. Prices remain at $1.90 per keg per carload and $2 at mill for smaller lots. Wire nails at mill are quoted at $2.45 per keg in car lots, in less quantities $2.55 at stores. Steel cut rails are selling at $2.10 per carload and at $2.15 in lesser lots.

Steel Rails.—In this market both standard and lighter sections are in good demand, and inquiry of considerable magnitude from the northwest is noted, which will probably materialize at an early day if delivery can be secured promptly; but local mills are reported sold well up, with deliveries extending to November, and small sales of standard sections have been made on a basis of $35.50 f.o.b. Numerous inquiries are reported for light weights. Local mills being full of orders brings Eastern mills into this field, having the effect to lessen prices to some extent. The outlook for new business is good. Quotations are stiffly maintained for light and heavy sections, ranging from $34 to $35 f.o.b. Chicago for late delivery for good round lots; small lots for prompt and early delivery command better prices.

Railway Track Supplies.—A good demand generally. Iron fish plates, $1.95@$2.00; steel, $2.10@$2.25; bolts, square nuts, $2.80@$2.90; hexagon, $2.95@$3; spikes, $2.05@$2.10.

Scrap Iron.—Both supply and demand have been better during the past week. We quote: Country mixed scrap, $13.50@$14, according to condition; No. 1 mill, $14@$14.50; light wrought, $9.50; horse shoes, $19.50@$20; axles, $23; cast machinery, $12.50@$13; stove plates, $9.50@$10; borings, $8.50@$8.75; wrought turnings, $11.50@$12; No. 1 railroad shop or forge, $19.50@$20; track scrap, $19.50.@$20.

Old Wheels and Rails are scarce, and probably will continue so, as railroads are not asking bids. Holders are very firm. Old rails are now quoted $25@$25.50. Old wheels are scarce, and selling at $19.50@$20. Old steel rails $19@$20.50, according to length, freedom from frogs, etc. Guards and frogs, $18.50@$19.

Ingot Copper.—The demand is considerably abated, but prices are firm at 18¼@18½c for Lake Superior. Casting brands are also steady at 15½c.

Sheet and Bolt Copper, 25c., pound rates; sheet brass, copper and brass wire, 20 per cent. discount factory delivery.

Louisville. Aug. 19.

(Special report by HALL BROS. & CO.)

The iron situation is more encouraging. Furnaces are holding firm, and many consumers are desirous of buying for future deliveries, believing that the market has reached bottom and that it will advance shortly. Louisville houses have made sales aggregating about 8,000 tons, some for deliveries running into February and March of next year. The market is in good condition, while prices remain about the same. The past few months have shown that the consumption was equal to the production, and consumers are about convinced of this fact and are covering their wants as far into the next year as possible, and in some cases paying a slight advance for long future deliveries. By September we look for an active advanced market. We quote substantially as last:

Hot Blast Foundry Irons.

Southern Coke	No. 1	15.00@ 15.25
" "	No 2	14.25@ 14 50
" "	No. 3	14.00@ 14.25
Mahoning Valley, Lake ore mixture		17.75@ 18.75
Southern Charcoal	No. 1	17.00@ 17.50
"	No. 2	16.50@ 17.00
Missouri "	No. 1	18.00@ 18.50
" "	No. 2	17 00@ 17.50

Forge Irons.

Neutral Coke	13.75@ 14 00
Cold Short	13.75@ 14.00
Mottled	12.75@ 13.25

Car Wheel and Malleable Irons.

Southern (standard brands)	22.00@ 23.00
" (other brands)	18.00@ 19.00
Lake Superior	22.50@ 23.00

Philadelphia. Aug. 22.

(From our Special Correspondent.)

Pig Iron.—The situation in the crude iron trade remains, to all appearances, precisely as it was a week ago. Despite all the talk about heavy shipments of Southern iron, very little has actually been sold. A good deal of attention is being given to Southern iron by Northern buyers, but there seems to be some uncertainty as to the wisdom of leaving old sources of supply for new. The inducements are rather trifling. A few odd lots have been sold, and sales will probably increase. The best quotation for No. 2 is $14@$14.50. Pennsylvania forge is quoted and selling at $15@$15.50. Brokers continue to talk about the strong probabilities of a heavy business in forge iron at an early day, and base their predictions upon the fact that there is a very heavy consumption going on; but up to present writing most of the business that has been done is of a hand-to-mouth character. A good deal of Northern No. 2 is selling at $16.50, and No. 1 at $18@$18.25. Bessemer pig is quoted at $19, without much business as yet, but there are good prospects.

Foreign Material.—Just as soon as importers can deliver 20 per cent. spiegel at $30 they will find customers ready for several thousand tons.

Muck Bars.—First-class bars are selling at $30.

Billets.—Business has been done at $32.50. Offers are now under consideration for several thousand tons at a trifle under this figure. Ordinary quotations, $33.

Merchant Iron.—Some little business is being done at as high as 1·90. Car builders are contracting for a good deal of material at 1·70@1·75 at mill. Mill owners think business will improve week by week.

Sheet Iron.—The pressure for early deliveries is much greater than it has been for some weeks. Stocks are with difficulty maintained in an assorted volume. Some heavy contracts are offered this week, but have not, at present writing, been placed, as mills are oversold.

Merchant Steel.—All lines of merchant steel are in excellent request, and, excepting where a large contract is to be placed, prices are exceptionally strong.

Skelp Iron.—Heavy orders, the heaviest for several months, have been booked this week, the top prices being 1·90, and bottom prices, 1·85 for grooved. There is a very urgent demand for sheared skelp also, and prices are 2·15@2·25.

Wrought Iron Pipe.—There is not the slightest shading on pipes or tubes. Since Monday a large amount of business has been presented, but not all of it placed. Discounts on butt-welded black are 47½ per cent. Orders for tubes are crowding in.

Plate and Tank.—Prices are firm, and mills are crowded with work. Iron ship plates are 2·25, and steel, 2·35. Bridge plate, 2·30 and 2·50, respectively. Shell, 2·45 and 2·65.

Structural Material.—Orders were taken this week for sheared plates at 2.40. A great deal of work is promised; large schemes are looming up, which will tax the capacity of structural mills for the winter, if the schemes materialize, which is likely.

Steel Rails.—The usual rumors are again rife this week about the probable placing of large orders for steel rails. Rail makers have known for months past where they could get plenty of business, provided they would accept prices which certain railroad builders were willing to pay. An offer for a large lot was made to-day at $30. Quotations, $30.50 to $31.50 for standard, and from $34 up to $40 for lighter sections.

Old Rails.—Sellers who have small lots of rails which they can deliver within a reasonable time are asking as high as $25.50, and will no doubt get it.

Scrap Iron.—Holders of scrap are asking $22.50 to $23 for No. 1 wrought, but some grades are selling at $22.

Pittsburg. Aug 21.

(From our Special Correspondent.)

Raw Iron and Steel.—The market during the week has developed nothing of special importance; prices, generally, have been well maintained, giving practical evidence that the bottom has been reached. The big sale of Bessemer we reported last week, extending during the balance of the year, at $18.50, fixes the prices of that description of iron for 5,000 or 10,000 ton lots; for smaller lots about 25 cents per ton would be considered a fair price. As a general thing leading dealers report an increased inquiry for Foundry and Grey Forge descriptions, the rates for city-made iron ranging from $15.50 to $15.75, while outside lots or unknown brands are generally shaded 25 cents per ton in order to effect sales. There is, and always will be, a wide difference of opinion among dealers; while one side will talk about lower figures in the near future, the other side will contend that an advance is not far off. Since our last issue several leading iron men have returned from the seashore and other points; by the first of September a considerable amount of activity may be looked for.

A leading Eastern iron dealer has this say: "The iron market shows unmistakable signs of improvement; there is a marked increase in the demand, and prices are firmer, almost without exception. The reduction of the output of manufactured material, which began about July 1st, when many mills throughout the country shut down for repairs or on account of labor troubles, imparted an increasing firmness to the market, and now that work has been pretty generally resumed the strength of trade has been fully maintained by the steady increasing demand."

The stoppage of work by certain mills prevents, for the time being, the delivery of pig-iron that had been sold, and it requires some little time for the furnaces to relieve themselves of the stock they have been holding for their customers. The accumulations are all sold, however. The furnacemen believe that it will not be long before the increasing activity in finished iron will make itself strongly felt in crude material.

On the whole the present situation is one in which the manufacturers find much encouragement, and the prospects of better business in the near future are regarded as very good.

In addition to the sale of 5,000 tons Bessemer I reported last week, another sale of 5,000 tons, independent of the former, has been made this week.

Coke Smelted Native and Lake Ores.

5,000 Tons Bessemer, Sept., Oct., Nov., Dec.	$18.50 cash.
2,000 Tons Bessemer, Sept., Oct.	18.75 cash.
1,500 Tons Grey Forge	15.25 cash.
1,000 Tons Bessemer, City Furnace	18.75 cash.
1,000 Tons Grey Forge, all the year	15.75 cash.
1,500 Tons Grey Forge, City Furnace	15.00 cash.
1,000 Tons Bessemer, Aug., Sept.	18.75 cash.
1,000 Tons Bessemer	18.60 cash.
500 Tons Grey Forge	15.50 cash.
500 Tons Grey Forge, all ore	16.75 cash.
500 Tons White and Mottled	14.65 cash.
500 Tons Grey Forge, City Furnace	15.50 cash.
250 Tons No. 2 Foundry	16.25 cash.
240 Tons No. 3 Foundry	15 75 cash.
100 Tons Silvery	18.00 cash.

Charcoal.

100 Tons Cold Blast, Southern	26.00 cash.
100 Tons Cold Blast	27.00 cash.
100 Tons Warm Blast	21.00 cash.
100 Tons No. 2 Foundry	22.75 cash.

Muck Bar.

2,000 Tons Neutral	30.00 cash.
600 Tons Neutral	30.00 cash.
500 Tons Neutral	29.75 cash.
450 Tons Neutral	29.50 cash.

Steel Billets and Slabs.

2,000 Tons Billets	30.60 cash.
1,000 Tons Billets	31.00 cash.

Steel Wire Rods.

600 Tons American Fives	45.00 cash.

Ferro-Manganese.

50 Tons 80 per cent.	75.00 cash.
50 Tons 80 per cent.	74.50 cash.

Bloom and Rail Ends.

1,500 Tons Bloom Ends	22.50 cash.
1,000 Tons Rail Ends	22.75 cash.
150 Tons Bloom Ends	22.75 cash.

Spiegel.

1,000 Tons 20 per cent. spiegel	32.50 cash.

Old Iron and Steel Rails.

1,500 Tons American T's	27.00 cash.
500 Tons American T's	27.25 cash.
300 Tons Old Steel Rails	22.25 cash.

Scrap Material.

250 tons No. 1 W. Scrap	net $22.50 cash.
200 tons No. 1 W. Scrap, del.	net 23.00 cash.
200 tons Leaf Steel	net 23.00 cash.
100 tons Old Iron Axles	net 30.90 cash.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Aug. 22.

Heavy Chemicals.—The situation in this market offers no radical change from last week. The topic of discussion continues to be the Chemical Union, but definite news as to its formation are still difficult to obtain. We published a cablegram in this column last week to the effect that the much-talked-of "Union" was an assured fact, but this was subsequently disproven.

As usual on such occasions, there have been rumors without end, most of which were without foundation. It is pretty generally believed that the union will be formed, but whether it will have the effect hoped for by outsiders and speculators is quite another thing. Thus far buyers have not shown any very great amount of anxiety, they having, very reasonably, refused to accept the asseverations of interested parties.

Manufacturers on the other side still have serious obstacles to surmount and differing interests to reconcile before they can have reason to call their attempt at a "trust" a success. We have been informed that contracts extending to next year have been made, and that some alkali makers have expressed their readiness to make contracts covering all of 1891 at a slight advance over present values, in which case buyers need not feel greatly alarmed about future prices.

Caustic soda has been sold for forward delivery, but the stock supply is light. Quotations are for 74-76 per cent. 2.95@2.95c., and about the same for the 77 per cent. variety.

Carbonated soda ash, both for the 48 per cent. and the 58 per cent. brands, has had a good demand during the week, and though prices have not materially advanced, the article is firm and we should not be surprised to see it higher. Quotations are 1·50@1·55c.

Caustic soda ash remains as reported last week, at $1.50.

Sal soda.—A better feeling is observed in this article, which is quoted at one cent.

Bleaching powder at last shows signs of coming activity, and an upward tendency is observable in prices. For spot goods 1·55@1·60c. is asked.

Acids.—This market remains in *statu quo*. The volume of business is reported by manufacturers to be good. Indeed, we have been assured by several makers that they have had to buy acid from less fortunate dealers, in order to meet their requirements. The trade is not complaining about lack of business, but dissatisfaction about the prices is universal.

The members of the "trust" and the outsiders have not of late been so bitter against each other, but, when the occasion comes when it is necessary to find a market for the whole of their product, we may expect to see a repetition of the strife as it was a few months ago, and which proved so beneficial to the consumer, but, so they say, so detrimental to the financial prosperity of several acid makers. We can only repeat the quotations which we have printed in this column during the past month or two. Acid, per 100 pounds in New York and vicinity: Acetic, $1.75@$2.25; muriatic,

18-degree, 80c.@$1.25; muriatic, 20-degree, 90c.@$1.50; muriatic, 22-degree, 90c.@$1.75; nitric, 36-degree, $2.75@$3.50; nitric, 40-degree, $3.25@$4.50; nitric, 42 degree, $3.75@$4.75; sulphuric, 60-degree, 70@80c., and sulphuric, 66-degree, 80c.@$1.

Fertilizing Chemicals.—The market for fertilizers still labors under the spell of midsummer dullness. There have been some inquiries for various articles, but actual trading has been light. In a few weeks the fall season sets in and dealers will begin to report good business. Our quotations this week are: High grade dried blood, $1.80@$1.85. For the low grade the price is $1.70@$1.75; Azotine, $1.90@$1.95. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $19@$20 per ton, and low grade 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18@$18.50. Fish scrap, $20@$20.50 per ton f. o. b. factory. Sulphate of ammonia, $3.15@$3.20. Concentrated tankage, $1.70@$1.75. Refuse, bone black, guaranteed 70 per cent. phosphate, $18@$18.50 per ton. Dissolved bone-black is nominally 65c. per unit for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $5.75 per ton; kiln-dried, $7@$7.25 per ton, f. o. b. vessels and cars respectively at the mines. Freights by sail from Charleston to New York, $2.75@$3.50 per ton. Charleston rock, ground $11.50@$12, ex vessel at New York.

Quotations are for 48 to 52 per cent. sulphate of potash, $1.12½ per 100 pounds for shipments from date; high grade manure salts, basis 90 per cent. sulphate of potash, $2.37½ per 100 pounds.

Mr. Paul C. Trenholm, of Charleston, S. C., sends us the following interesting statistics showing shipments of phosphate rock from Charleston, S. C., for July 1888, 1889 and 1890.

	1888.		1889		1890.	
	Crude	Gr'nd.	Crude	Gr'nd.	Crude	Gr'nd.
Domestic.....	17,124	1,075	18,663	Nil.	21,599	Nil.
Foreign.....	Nil.	Nil.	Nil.	Nil.	5,284	Nil.
Grand total.	17,124	1,075	18,663	Nil.	26,883	Nil.

Kainit.—There is absolutely nothing new to report in this article. Quotations remain as last given, $9.65 and $10 for invoice and actual weights respectively.

Muriate of potash.—Sales aggregating some 400 tons are reported. The arrivals this week were 250 tons, all of which went into consumption. Stocks are light and quotations remain the same. $1.77½@$1.82½ for all ports.

Nitrate of soda.—Quotations are given $1.70 ex-store. To arrive, $1.67½ is asked, but buyers show a disinclination to place their orders at this figure. The market is quiet, but slightly firmer.

Brimstone.—There is not much doing in this market just now. Buyers decline to do more business than is strictly necessary at present prices, which are $20.50@$20.75 for best unmixed seconds and $20@$20.25 for thirds.

NOTES OF THE WEEK.

A press cablegram says that the English Papermakers' Association has resolved to start a chemical works of its own in the event of the formation of the chemical union.

Liverpool. Aug. 13.

[Special Report by Messrs. J. P. Brunner & Co.]

There is only a moderate business passing in heavy chemicals at present, but prices generally are firm.

To-day the committee have given manufacturers authority to quote for forward delivery at the following minimum prices :

October—December. 1890.		All 1891.	
Soda ash, 1¼d.	1⅜d. for 48 per cent. / 1 5-16d. for 58 "	all f. o. b. here.	
Caustic soda, 70%.	£10 5s.,	£10 10s.	
Hardwood Bleach.	£6 5s.,	£6 10s.	

This announcement has only been made public this afternoon, so that there has been hardly time for any opinion to be expressed with reference to this step.

As regards the formation of the "Union" itself there is no fresh news, but it is stated that the scheme will probably be put before the public toward the end of next month.

Soda ash on the spot is scarce and steady at 1⅛d.@1¼d. for caustic and 1¼d.@1½d. for carbonated, according to brands.

Soda crystals are dearer at £3 7s. 6d. for prompt delivery, and £3 5s.@£3 10s. for the month.

Caustic soda is in small compass and steady. There is some little business going on, but buyers have not been eager to operate lately. We quote: 60 per cent., £8 17s. 6d.@£9; 70 per cent., £9 17s. 6d.@£10; 74 per cent., £11.

Bleaching powder has met with little attention, and as low as £5 10s. has been accepted for hardwood, but 2s. 6d. to 5s. per ton more money is now quoted by holders.

Chlorate of potash inactive, and 5d. remains nearest spot quotation.

Bicarb. soda selling freely @£5 15 s. per ton, and upwards for one cwt. kegs, according to brand and quantity with usual allowances for larger packages.

Sulphate of ammonia is in small compass, and £11 15s. lowest quotation for good grey, 24 per cent., double bags f. o. b. Liverpool.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, August 22.

Bricks.—The market is naturally very much agitated by the troubles among the brickmen. In our notes of the week an account of the situation will be found. Quotations are for Haverstraws and Uprivers, $5.50@$6; Jerseys, $4.75@$5.25, and pales, $3@$3.25 per 1,000.

Lime.—The uncertainty prevalent in the market for building materials has had an appreciable effect on lime, which is just now necessarily quiet. The local agents of lime manufacturers have recommended a cessation of shipments, and, as a result, but little of the article is arriving. Quotations remain: Rockland, common and finishing, 90c. and $1.20; St. John, common and finishing, 85c. @95c.; Glen Falls, common and finishing, 85c.@1.10.

NOTES OF THE WEEK.

A notice has been issued for a convention in New York City, on October 6th, to organize a national association of the marble cutters of the United States.

The stone masons' unions of Pittsburg, Pa., McKeesport, Pa., Baltimore, Md., and Syracuse, N. Y., have united in a call for a convention at Baltimore on September 8th to organize a national union.

The Mount Adam Granite Company, of Middletown, N. Y., is in the hands of the Sheriff of Orange County. The company was orgauized three years ago with $56,000 capital stock for working the granite quarries at Mount Adam. The company has expended a good deal of money in buildings and machinery, and in constructing a spur from its quarries to the Pine Island branch of the Erie Railroad. In raising funds for these the company's notes have been endorsed by three stockholders. These endorsers are secured by a chattel mortgage on all the property of the company. Other creditors, becoming impatient for their dues, have secured judgments against the company. The indebtedness of the company outside of the capital stock is said to be $36,000 or more.

The Association of Brick Manufacturers held a meeting and resolved to close their yards in New Jersey and along the Hudson, and refuse to ship brick to this city, Brooklyn, or Jersey City until the Board of Walking Delegates raise their boycott of the firms who are members of the Manufacturers' Association. The visible supply of brick with which the building operations of the three cities are to be carried on is about 15,000,000. This includes the brick already loaded for shipment to these points. The supply required daily is about 5,000,000. After Monday, therefore, the only building operations that can be carried on will be with brick furnished by manufacturers not in the association and by a half dozen firms who have been unable to join through having contracts on hand which had to be filled. As the latter fill their contracts they will also refuse to ship more brick. The supply from both these sources will be less than 1,000,000 per day. Unless, then, something unforseen occurs over sixty thousand men engaged in different branches of the building trades will be thrown out of employment. At all the brickyards in this city dealers were very busy. Builders and contractors are laying up a supply while they can. The price, however, has not advanced much and will probably go but little higher until the famine comes. H. N. Wood, secretary of the Manufacturers' Association, said the makers would stand firm. The Board of Walking Delegates expressed similar sentiments.

IMPORTS AND EXPORTS OF METALS AT NEW YORK FROM AUGUST 9 TO AUGUST 16 AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co....		272
Hendricks Bros....		50
La Marche's Sons, H....		5
Lewisohn Bros....	50	100
Meyer, G. A. & E....		9
Milne & Co....		74
Muller, Schall & Co....		123
Total....	50	633
Corres. date, 1889....		947

Pig Lead.	Lbs.	Lbs.
Caswell, E. A....		111
Hendricks Bros....		100
Schulz & Co., A....		98
G .W. Sheldon....		149
Total....		458
Corres. date, 1889....		140

Tin.	Tons.	Tons.
Abbot, Jere, & Co.	25	125
Amer. Metal Co....		2,125
Bidwell & French.		815
Bruce & Cook....		10
Carter, Hawley & Co....		75
Cohen, H....		20
Cort & Co., N. L....	55	125
Crooks & Co., R....		85
Davol & Son....		34
Hendricks Bros....		26
Knauth & Kuhne....		10
Lehmaier, S., & Co....		102
Lewisohn Bros....		20
Merchant & Co....		30
Muller, Schall & Co.		620
Naylor & Co....		1,146
Nissen, Geo....		10
Phelps, Dodge & Co	96	2,416
Thomson, A. A. & Co....		40
Thomson, D. & Co.	10	70
Townsend, & Co., J. R....		50
Trotter & Co, N....		75
Total....	186	8,059
Corres. date, 1889..	100	6,697

Tin Plates.	Boxes.	Boxes.
Bruce & Cook....	4,387	89.171
Byrne & Son....		1,000
Central Stamp. Co.	855	49.269
Coddington & Co...	7,290	87,495
Cohn & Co		14,179
Con. Fruit Jar Co.		120
Corbiere F. & Co...	300	7,707
Cort & Co....	7,510	128,964
Crooks & Co....	13,184	63,474
De Milt & Co ,H R.	1,706	6,0.0
Dickerson, V. D. & Co	19,907	244,700
Fenton, D. E....	1,219	2,256
Haberman, F....		66
Herring, Chas. E.		1,000
Iron Clad Mfg. Co.		379
Lalance & G. M. Co.	255	8,788
Lazard Bros....		1,048
Lehmaier, Schw'z & Co....		200
Merchant & Co....	1,994	20,557
Mersick & Co.... ..	1,121	8,642
Morewood & Co....		37,217
Newell Bros....		416
Payne, S. H. & Co.	100	784
Pratt Mfg. Co....	2,316	90,874
Phelps, Dodge & Co	61,947	587,946
Schneider & Co., J.	2,865	2,865
Shepard & Co....	756	4,749
Taylor, N. & G....		1,229
Thomson & Co., A. A.	1,515	76,083
Warren, J. M		4,320
Wheeler & Co....	2,562	22,990
Whittemore & Co.		12,953
Wolff & Reesing....		2,077
Wright, Peter & Co.		227
Total....	136,989	1,579.975
Corres. date, 1889..	34,899	1,516,889

Pig Iron.	Tons.	Tons.
Abbott & Co., Jere.		200
Baldwin & Co., A..		807
Baldwin Bros. & Co.....		170
Crocker Bros.....	100	1,200
Crooks & Co., R....		5
Dana & Co..		150
Drummond & Co.		400
Geisenheimer & Co		76
Hagermeyer & Brun		30
Henderson Bros.		100
Irvin. R. L & Co		300
Lillienberg, N.....		1,909
Naylor & Co.....		150
Pierson & Co.....		30
Sheldon, G. W. & Co.....		200
Stetsson & Co., G. W.....		1,925
Williamson, J. & Co.	50	1,600
Total.....	150	9,252
Corres. date, 1889...	1,365	19,397

Steel Blooms, Billets, and Slabs.	Tons.	Tons.
Abbott & Co.....		5
Baldwin Bros. & Co.....		2
Dana & Co....		1,670
Downing, R. F. & Co.		107
Henderson Bros....		1
Martin & Co		80
Milne, A., & Co.. ..		68
Naylor & Co.....	339	339
Pope, Jas. E., Jr.		61
Richards & Co., C. B.		1
Roebling's Sons, J. A.....		2,074
Wolff, & Co., R. H.		60
Total.....	339	4,468
Corres. date, 1889..		50,017

Bar Iron.	Tons.	Tons.
Abbott & Co., Jere.	5	741
Bacon & Co.....		1,036
Crocker Bros.....		77
Dickerson, Van Dusen & Co.....		6
Downing & Co.....		285
E. J. Jacobus.		8
Fuller, Dana & Fitz.		11
Holt, H. N..... ..	120	180
Lilienberg, N.....		947
Lundberg, G.....	214	2,171
Milne & Co..... .	98	1,016
Muller, Schall & Co.		289
Naylor & Co.....	60	397
Page, Newell & Co.	50	1,654
Plenty, J		14
Wilson, J. G.....		3
Total.....	547	8,335
Corres. date, 1889...	418	5,784

Scrap Iron.	Tons.	Tons.
Crossman & Co., W. H.....		30
Muller, Schall & Co		18
Samper & Co., S.		186
Stevens, Corvin & Co.....		30
Ward, J. E. & Co..	75	567
Total.....	75	831
Corres. date, 1889...	50	1,288

Steel and Iron Rods.	Tons.	Tons.
Abbott & Co.....	257	7,281
American S. Co....		665
Bacon & Co.....		463
Carey & Moen.....		466
Cooper, Hewitt & Co.....		371
Dana & Co.	76	574
Downing & Co.....		129
Galpin, S. A.....		1,306
Greely & Co. C. S.		35
Hazard Mfg. Co .	21	349
Holt & Co., H. N...	3	3
Jacobus, E. Y.....		2
Lee, James & Co...	155	1,554
Lillienberg, N.		300
Lundberg, G.....		126
Lundell, C. G	5	5
Milne & Co..... ..	548	1,304
Muller, Schall & Co.		732
Naylor & Co.....	149	4,136
Page, Newell & Co.	50	1,229
Roebling's Sons, J. A.		2,157
Schulze & R.		1
Temple & Lockw'd		6
Wessel & Co.....		21
Wiebusch & Ho...		4
Wood & Niebuhr..		25
Wolf & Co., R. H..	114	2,945
Total.....	1,378	26,029
Corres. date, 1889..	3,685	35,155

Old Rails.	Tons.	Tons.
Bowring & Archibald.....		340
Dana & Co.....	400	750
Frankfort. M.....	844	5,021
Henderson Bros...		300
Hernsheim, L		350
Moale Bros.....		123
Naylor & Co.....		1,968
Sawyer, Wallace & Co....		610
Wiechers, J. F.. ..	123	123
Total.....	1,367	9,585
Corres. date. 1889..		9,135

Spiegeleisen.	Tons.	Tons.
Abbott, Jere & Co.		2,725
American Metal Co.....		100
Blakely & McLellan.....		1,684
Crocker Bros	736	17,511
Crooks & Co R		106
Dana & Co.....		15,900
Foley, F.....		50
Geisenheimer & Co.	130	543
Henderson Bros. & Co.	14	14
Hernsheim. L.....	491	16,240
Holt, H. N.		200
Naylor & Co.....	45	9,976
Perkins, C. L.....		1,422
Sachs & Richmond.		2
Whittemore, H. & Co.		55
Total.....	1,416	65,584
Corres. date, 1889...	895	45,456

Iron Ore.	Tons.	Tons.
Baiz, Jacob.....		67
Bowring & Archibald.....		4,092
Earnshaw, A.....		3,517
Ennis, Andrew		438
Flores & Co., R. de	394	13,798
Johnson & Co., L..		5,030
Total.....	394	26,942
Corres. date, 1889..		8,860

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co., Jere.		2,522,603
Amer. Met. Co., L..	36.177	940,3.5
Barber & Co		15,150
Belmont, Aug. & Co		1,763,974
Burgass & Co.....	37,809	211.5.3
French, Edye & Co.....		135,374
Heidelbach, Sicher-heimer & Co		672,608
Muller, Schall & Co.....		16,250
Sawyer, Wilcox & Co.....		22,796
Seamen, S. H.....		66,950
Ward, J. E. & Co.		160,000
Wilms & Thune.		112,004
Total.....	73,986	6,583,237
Corre. date, 1889...	253,050	4,5..1,9.6

Copper Matte.		
American Metal Co.	325,000	3 072,079
Lewisohn Bros.		1,705,246
Nichols, Geo. H...		267,202
Paulsen, Wm...		1,033,428
Wilms & Thune.		2,848,506
Total	325,000	8 931,261
Corres. date 1889..	7,110	17,258,467

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last.			Dividends. Total paid.	Date and amount of last.		
1	Adams S. L.	Colo.	$1,500,000	150,000	$10	*	....	....	....	$555 000	Jan.	1887	.10
2	Alice, s. c	Mont	10,000,000	400,000	25	*	....	....	....	850,000	July	1890	.06¼
3	Alma&Nel Wood C.,c	Idah	300,000	30,000	10	*	....	....	....	90,000	Jan.	1890	.50
4	American & Nettie,c.	Colo.	.....	300,000	....	.....	.....	.....	.....	150,000	Nov.	1889	10
5	Amy & Silversmith,s.	Mon.	.....	341,419	....	.....	.....	.....	.....	247,530	Aug.	1887	1½
6	Atlantic, C	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	660,000	Aug.	1890	1.00
7	Argenta, s	Nev.	10,000,000	100,000	100	33b,000	July	1889	.10	40,000	Feb.	1880	.20
8	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	*	....	....	....	480,000	Aug	1890	.10
9	Aurora, L	Mich	2,000,000	100,000	20	*	....	....	....	155,000	Oct.	1887	1.87½
10	Badger, s	Ont.	250,000	50,000	5	*	....	....	....	87,500	Mar.	1890	.25
11	Bassick, G.	Colo.	10,000,000	100,000	100	*	....	....	....	400,000	Mar.	1884	1.00
12	Belle Isle, s	Nev..	10,000,000	100,000	100	*	....	....	....	300,00.	Dec	1879	25
13	Belcher, G. S.	Nev..	10,400,000	104,000	100	2,028,000	Apl.	1890	.50	15,397,000	Apl.	1876	1.00
14	Bellevue Idaho, S. L.	Idah.	1,250,000	125,000	10	120,000	Dec.	1889	25	200,000	Jan.	1887	10
15	Bodie Con., G. S.	Cal	10,000,000	100 000	100	575,000	Nov	1889	25	1,602,572	Apl.	1890	.50
16	Boston & Mont., G.	Mon	2,500,000	250,000	10	*	....	....	....	530,000	Jun.	1886	.15
17	Boston & Mont., C.S.	Mon	2,500,000	100,000	25	*	....	....	....	1,450,000	Aug.	1890	1.50
18	Breece, S	Colo	5,000,000	200,000	25	*	....	....	....	2,000	Feb.	1880	.01
19	Brooklyn Lead, L. S.	Utah	500,000	50,000	10	*	....	....	....	127,000	July	1887	.05
20	Bulwer, G	Cal.	10,000,000	100,000	10	130,000	Aug.	1889	.25	175 000	Jan.	1884	.10
21	Bunker Hill & Sull.	Idah.	3,000,000	300,000	10	*	....	....	....	150.000	Oct.	1883	.06⅔
22	Caledonia, G	Dak.	10,000,000	100,000	100	505,000	May	1886	.15	75,000	Aug.	1890	.05
23	Calliope, S	Colo.	1,000,000	1	1	*	....	....	....	90,000	Apl.	1890	.01
24	Calumet & Hecla, C	Mich	2,500,000	100,000	25	1,200,000	....	....	....	34,350,000	May	1890	5.00
25	Carbonate Hill & L.	Colo.	1,500,000	200,000	10	*	....	....	....	80,000	Apl.	1884	.05
26	Carlisle, G	N. M.	1,000,000	200,000	5	*	....	....	....	175,000	Dec.	1888	.12½
27	Castle Creek, G	Idah.	100,000	100,000	1	*	....	....	....	51,000	Oct.	1883	.03
28	Catalpa, S. L	Colo.	3,000,000	300,000	10	*	....	....	....	270,000	May.	1884	.10
29	Central, C	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,980,000	Feb.	1890	1.00
30	Chrysolite, S. L	Colo.	10,000,000	200,000	50	*	....	....	....	1,650,000	Dec.	1884	.25
31	Colorado Central, S. L	Colo.	2,750,000	275,000	10	*	....	....	....	406,250	Aug.	1889	.05
32	Confidence, S. L	Nev..	.....	24,960	....	306,160	Mar.	1890	.75	199,680	Apl.	1889	1.00
33	Cons. Cal. & Va., G. S.	Nev.	21 600 000	216,000	100	108,000	Jan.	1885	.20	3,466,800	Apl.	1890	.25
34	Contention, S	Ariz.	12,500,000	250,000	50	....	....	....	....	₹8,587,500	Dec.	1884	.25
35	‡Cop.Queen Cons,C.	Ariz.	1,400 000	140,000	10	.....	.....	.....	.....	210,000	Feb.	1889	.50
36	Crescent, S. L. G	Utah	15,000,000	600,000	25	*	....	....	....	228,000	Oct.	1888	.03
37	Crown Point, G. S.	Nev..	10 000.000	100,000	100	2,880,000	Sept	1880	.50	11,588 000	Jan.	1875	2.00
38	Daly, S. L	Utah	3,000,000	150,000	20	*	....	....	....	1,612 800	Aug.	1890	.25
39	Deer Creek, L. G	Idah.	1 000,000	200,000.	5	*	....	....	....	20,000	Jun.	1889	.05
40	Deadwood-Terra, G.	Dak.	5,0 0,000	300,000	25	*	....	....	....	11,000,000	Nov.	1887	.10
41	Derbe B. Grav., G. S.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	210,000	Oct.	1889	.10
42	Dunkin, S. L	Colo.	5,000,000	200 000	25	*	....	....	....	390,000	Oct.	1889	.05
43	Dunstone, G. S. L	Mont	1,900,000	200,000	5	*	....	....	....	6,000	Nov.	1888	.03
44	Eclipse	Colo.	100,000	100,000	1	*	....	....	....	20,000	Nov.	1887	.10
45	Elkhorn, G. S	Mont	1,000,000	100,000	10	50,000	July	1883	.50	850,000	July	1887	.05
46	Empire L., G	Mont	500,000	50,000	5	*	....	....	....	70,500	Oct.	1887	.37½
47	Eureka Con., G. S. L.	Nev..	5,000,000	50,000	100	550,000	Jun.	1889	.50	4,980,000	Sept	1890	.25
48	Evening Star, S. L	Colo.	500,000	50,000	10	*	....	....	....	145.000	Dec.	1889	.25
49	Excelsior, G	Cal..	10,000,000	100,000	100	560,000	Sept	1885	1.00	875,000	Oct.	1880	.25
50	Father de Smet, G.	Dak.	10,000,000	100 000	100	200,000	Nov	1878	1.00	1,125.000	Dec	1885	.20
51	Franklin, C	Mich	1,000,000	40,000	25	220,000	Jun.	1871	....	930,000	Jan.	1889	2.00
52	Freeland, G. S.	Colo.	5,000,000	200,000	25	*	....	....	....	190,000	July	1886	.10
53	Garfield Lt., G. S.	Mont	500,000	50,000	5	*	....	....	....	95,000	Jul.	1888	.12½
54	Gould & Curry, G. S.	Nev..	10,300,000	103,000	100	4,466,500	Apl.	1890	.30	926,800	Oct.	1870	10.00
55	Grand Prize, S	Nev..	10,000,000	100,000	100	715,000	Nov.	1889	.30	525,000	Jan	1880	.30
56	Granite, S. L	Idah.	500,000	500,000	1	*	....	....	....	28.400	Oct.	1889	.02
57	Granite Mountain, S.	Mont	10,000,000	100,000	25	*	....	....	....	9,200.000	July	1890	.50
58	Green Mountain, G.	Cal..	1,250,000	125,000	10	*	....	....	....	212.000	Nov.	1881	.07½
59	Hale & Norcross, G.	Nev.	11,200,000	112,000	100	5,086,000	July	1887	.50	1,162,000	July	1888	.50
60	Iecla Con., S. G. L. C.	Mont	1,500,000	30,000	50	*	....	....	....	1,500,000	Apl.	1889	.50
61	Hel'a Mg & Red, G.S.L.	Mont	3,315,000	663,000	5	*	....	....	....	197,973	July	1886	.06
62	Holmes, S	Nev.	10,000,000	100,000	10	325,000	Mar.	1890	.25	75,000	Apl.	1886	.25
63	Holyoke, G	Idah	200,000	200,000	1	*	....	....	....	27.000	Feb	1883	.10
64	Homestake, G	Dak.	13,500,000	135,000	100	900,000	July	1878	1.00	5,581,250	Aug.	1890	.10
65	Honorine, S. L	Utah	500,000	250,000	2	37,500	Apl.	1889	.05	125.000	Sept	1887	.05
66	Hope, S	Mont	1,000,000	100,000	10	*	....	....	....	223,200	Apl.	1888	.25
67	Horn-Silver, S. L	Utah	10.000.000	100,000	25	*	....	....	....	4,150,000	Jun.	1890	.12½
68	Hubert, G	Colo.	1,000,000	1 mil'n	1	*	....	....	....	247.000	Dec.	1889	.00⅝
69	Idaho, G	Cal..	310,000	3,100	100	....	....	....	....	5,235,900	Dec.	1889	5.00
70	Ideal, S. L	Colo.	1,500,000	50,000	10	*	....	....	....	15,000	Oct.	1886	.05
71	Illinois, S	N. M.	100,000	100,000	1	*	....	....	....	45,000	Apl.	1889	.20
72	Independence, S	Nev.	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept	1879	.25
73	Iron Hill, S	Dak.	2,500,000	250,000	10	134,000	July	1889	.03	156,250	Nov	1887	.07½
74	Iron-Silver, S. L	Colo.	10,000,000	500,000	20	*	....	....	....	2,500.000	Apl.	1889	.20
75	Jackson, G. S	Nev.	5,000,000	50,000	100	237,500	Nov	1880	.20	55,000	Jun	1889	.10
76	Jay Gould,	Mont	2,000,000	40,000	5	*	....	....	....	459,000	May	1890	.04
77	Jocuistita,	Mex.	2,500,000	250,000	10	*	....	....	....	1,200,000	Feb.	1885	.50
78	Jumbo, G	Colo.	2,000,000	200,000	10	*	....	....	....	35,000	Oct.	1887	.02¾
79	Kearsarge, C	Mich	1,250,000	50,000	25	190,000	Oct.	1887	1.00	100,000	Jan.	1890	2.00
80	Kentuck	Nev.	3,000,000	30,000	100	369,000	Dec.	1889	.30	1,350,000	Dec.	1886	.10
81	La Plata, S. L	Colo.	2,000,000	200,000	10	*	....	....	....	610,000	Sept	1882	.30
82	Leadville Cons., S. L.	Colo.	4,000,000	100,000	10	*	....	....	....	1423,000	Apl.	1889	.05
83	Lexington, G. S	Mont	4,000,000	40,000	100	*	....	....	....	609,000	Jan.	1885	2.00
84	Little Chief, S. L	Colo.	10,000,000	100,000	50	*	....	....	....	810,000	Jan.	1890	.05
85	Little Pittsburg, S. L	Colo.	20,000,000	200,000	100	*	....	....	....	1,600,000	Mch.	1889	50
86	Little Ruie	Colo.	500,000	500,000	....	*	....	....	....	30,000	Jun.	1890	.02
87	Mammoth	Utan	.....	.....	1	.....	.....	.....	.....	480,000	Aug.	1890	.10
88	Martin White, S	Nev..	10,000,000	100,000	100	100,000	Feb.	1890	25	140,000	Dec.	1886	.25
89	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*	....	....	....	175,000	May	1888	5.00
90	Matchless, S	Nev.	500,000	500,000	1	*	....	....	....	15,000	Feb.	1889	.00⅝
91	May Mazeppa	Colo.	1,000,000	100,000	1	*	....	....	....	100,000	Aug.	1890	.01
92	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1 00	1,820,000	Mar.	1876	.....
93	Mono, G	Cal.	5,000,000	50,000	100	102,850	Nov.	1889	.25	12.500	Mar.	1886	.25
94	Montana, Lt., G. S.	Mont	3,300,000	660,000	5	*	....	....	....	3,515,306	Aug.	1890	.06
95	Morning Star, S. L	Colo.	1,000,000	100,000	10	*	....	....	....	850,000	Dec.	1889	.20
96	Moulton, S. G	Mont	2,000,000	400,000	5	*	....	....	....	380,000	Dec.	1887	.07½
97	Mount Diablo, G	Cal.	150,000	6,000	1	*	....	....	....	150,000	Feb.	1887	.30
98	Mt. Diablo, S	Nev.	5,000,000	50,000	100	137,500	Jun.	1880	2.00	105,000	Oct	1889	.20
99	Napa, Q	Cal..	700,000	100,000	7	*	....	....	....	370,000	July	1890	.10
100	Navajo, G. S	Nev..	10,000,000	100,000	100	485,000	Apl.	1888	.30	365,000	Apl.	1889	.10
101	New Guston, S	Colo.	500,000	100,000	5	*	....	....	....	337,500	Apl	1890	.50
102	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*	....	....	....	30,000	Dec.	1885	.00⅝
103	Northern Belle, S	Nev..	5,000,000	50,000	100	425,000	Jan.	1884	8.30	2,400,000	Apl.	1889	.50
104	North Belle Isle, S.	Nev..	10,000,000	100,000	100	400,000	Sept	1889	.20	220,000	May	1888	.50
105	North Star, G	Cal..	1,000,000	100,000	10	*	....	....	....	250,000	Dec.	1889	.50
106	Ontario, S. L	Utan	15,000,000	150,000	100	.....	.....	.....	.....	11,225,000	Aug.	1890	.10
107	Ophir, G. S	Nev..	10,000,000	100,000	100	1,159,440	May	1889	.50	1,895,800	July	1882	1.00
108	Original, S. C	Mont	1,500,000	60,000	25	*	....	....	....	123,000	July	1888	.05
109	Oro	Colo.	.....	.....	....	.....	.....	.....	.....	60.000	Jun.	1889	.20
110	Osceola, S	Mich	1,200,000	48,000	25	480,000	Apl.	1876	1.60	1,372,000	Sept	1890	1.00
111	Oxford, G	N. S.	125,000	125,000	1	*	....	....	....	75,500	Sept	1888	.02
112	Paradise Valley, G. S.	Nev.	10,000,000	100,000	100	67,000	Apl	1888	.15	150,000	Apl	1887	.10
113	Parrot, C	Mont	1,800,000	180,000	10	*	....	....	....	642,000	Jun	1890	.03
114	Peacock, S. G. C	N.M.	2,000,000	200,000	10	*	....	....	....	60,000	Nov.	1886	.....
115	Plumas Eureka, G	Cal..	1,406,250	140,625	10	*	....	....	....	2,548,046	Oct.	1889	.37½
116	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*	....	....	....	20,000	Feb.	1886	.10
117	Plymouth Con., G	Cal..	5,000,000	100,000	50	*	....	....	....	2,000,000	Feb.	1885	.40
118	Quicksilver, pref., Q	Cal..	4,300,000	43,000	100	....	....	....	....	1,575,791	Aug.	1890	1.50
119	com., Q	Cal..	5,700,000	57,000	100	....	....	....	....	643,867	July	1882	.40
120	Quincy C	Mich	1,000,000	40,000	25	200,000	Dec.	1862	....	5,570,000	Aug	1890	5.00
121	Republic, C	Mich.	5,000,000	100,000	50	400,000	Dec.	1889	.30	4,312,587	Jun.	1887	1.25
122	Richmond, S. L	Nev..	1,350,000	54,000	25	*	....	....	....	99,785	Feb.	1890	.50
123	Ridge, C	Mich.	500,000	20,000	25	219,939	Mar	1886	.50	585,000	Mar.	1886	.05
124	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*	....	....	....	100,000	Dec.	1882	.50
125	Robert E. Lee, S. L.	Colo	10,000,000	500,000	20	*	....	....	....	4,460,000	July	1889	3.00
126	Savage, S	Nev..	11,200,000	112,000	100	6,542,000	July	1889	.50	7,500	Apl.	1883	.01
127	Shoshone, G	Idah.	150,000	150,000	1	*	....	....	....	1,568,145	Apl.	1888	.12½
128	Sierra Buttes, G	Cal..	2,225 000	122,500	10	*	....	....	....	102,000	Jan.	1871	1.00
129	Sierra Nevada, G. S.	Nev.	10,000,000	100,000	100	6,250,000	Oct.	1889	.50	270,000	Apl.	1889	.10
130	Sierra Nevada, S. L.	Idaho	1,000,000	1	....	*	....	....	....	40,000	May	1889	02
131	Silver Cord, G. S. L.	Colo.	4,500,000	450,000	10	*	....	....	....	270,000	Apl	1889	.10
132	Silver King, S	Ariz.	10,000,000	100,000	100	50,000	Jan.	1890	.30	1,950,000	July	1887	.25
133	Silver Mg. of L. V	N. M.	500,000	500,000	1	*	....	....	....	150.000	Aug.	1890	.05
134	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*	....	....	....	50,000	Jan	1881	25
135	Smuggler Union, S	Colo.	5,000,000	250,000	20	*	....	....	....	3,137,500	Jun	1889	.10
136	Spring Valley, G	Cal..	200,000	200,000	1	50,000	Oct.	1886	.25	3,585,000	Jun.	1888	.06
137	Standard, G. S	Cal..	10 000,000	100,000	100	50,000	Feb.	1890	.25	155,000	Nov.	1881	.06
138	Stormont, S	Utah	500,000	500,000	1	*	....	....	....	844.00	Dec.	1887	.20
139	St. Joseph, L	Mo..	1,500,000	150,000	10	*	....	....	....	9,000	Apl.	1888	.02⅛
140	Swansea, G	Colo.	600,000	60,000	10	*	....	....	....	100,000	Nov	1881	.20
141	Tamarack, C	Mich.	1,000,000	40,000	25	520,000	Apl.	1886	3.00	1,56 ,000	July	1890	3.00
142	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*	....	....	....	1,250,000	Apl.	1852	.10
143	United Verde, G	Ariz.	3,000,000	300,000	10	*	....	....	....	9,500	Feb.	1884	.10
144	Valencia, M	N. H.	150,000	1,500	100	*	....	....	....	41 250	Apl.	1886	2.50
145	Viola Lt., S. L	Idah.	750,000	150,000	5	*	....	....	....	272,500	Oct.	1887	.37½
147	Ward Cons., S. L	Colo.	4,000,000	200,000	10	*	....	....	....	20,000	Dec.	1889	.15
148	Yankee Girl	Colo.	2,500,000	250,000	10	*	....	....	....	1,275,000	July	1887	10
149	Yellow Jacket, S. E.	Nev..	12,000,000	120,000	100	5,508,000	Mar.	1889	.50	2,184,000	Aug	1871	1.50
150	Webb City, L. Z	Mo.	55,000	11,000	5	*	....	....	....	8,400	July	1889	.10
151	Woodside	Utah	.....	.....	....	.....	.....	.....	.....	25,000	Oct.	1889	.25
152	Young America	Cal.	.....	.....	....	.....	.....	.....	.....	175,000	....	1889	.10

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value.	Assessments. Total levied.	Date & am t of last.		
1	Agassiz Cons., S. L.	Colo.	$2,500,000	50,000	$50	*	....	....	....
2	Alleghany, S	Colo.	5,000,000	500,000	10	*	....	....	....
3	Allouez, C	Mich	2,000,000	80,000	25	$737.000	Jan.	1890	7
4	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	5&3,750	July	1889	.50
5	Alta, S	Nev..	10,080,000	100,800	100	2,248,800	Sept	1888	.50
6	Amador, G	Cal..	400,000	200,000	2	*	....	....	....
7	American Flag, S	Colo.	1,250,000	125,000	10	300,000	Jun	1877	....
8	Amity S	Colo.	250,000	250,000	1	*	....	....	....
9	Anglo-Montana, Lt.	Mon.	600,000	120,000	5	*	....	....	....
10	Astoria, G	Cal..	200,000	100,000	2	*	....	....	....
11	Barcelona, G	Nev..	5,000,000	200,000	25	*	....	....	....
12	Bechtel Con., G	Cal..	10,000,000	100,000	100	173,500	Jan.	1883	.1
13	Belmont, S	Nev..	5,000,000	50,000	100	735.000	Apl.	1886	.10
14	Best & Belcher, G. S.	Nev..	10,080,000	100,800	100	2,180,590	Jan.	1890	.25
15	Big Pittsburg, S. L.	Colo.	90,000,000	900,000	100	*	....	....	....
16	Bi-Metallic, S	Mon.	5,000,000	200,000	25	*	....	....	....
17	Black Oak, G	Cal..	3,000,000	300,000	10	*	....	....	....
18	Boston Con., G	Cal..	10,000,000	100,000	100	170,000	Nov	1883	.25
19	Bremen, S	N. M.	5,000,000	500,000	10	*	....	....	....
20	Brownlow, S	Colo.	250,000	250,000	1	*	....	....	....
21	Brunswick, G	Cal..	2,000 000	400,000	5	*	....	....	....
22	Bullion, G. S.	Nev..	10,000,000	100,000	100	4,007,000	Aug.	1888	.50
23	Calaveras, G	Cal..	500,000	500,000	1	*	....	....	....
24	Carisa, G	Wy	500,000	100,000	5	*	....	....	....
25	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*	....	....	....
26	Cashier, G. S	Colo.	500,000	250,000	2	*	....	....	....
27	Charles Dickens, G. S.	Idah.	1,250,000	250,000	5	*	....	....	....
28	Chicago, G	Cal.	1,500,000	150,000	10	*	....	....	....
29	Chollar, S	Nev..	11,200,000	112,000	100	1,484,000	July	1889	.50
30	Cleveland, T	Dak.	1,000,000	500,000	2	*	....	....	....
31	Colchis	N. M.	500,000	50,000	10	*	....	....	....
32	Commonwealth, S	Nev..	10,000,000	100,000	100	170,000	Nov	1882	.50
33	Comstock, G. S	Nev..	10,000,000	100,000	100	30 000	Mar.	1887	.15
34	Con. Imperial, G. S.	Nev..	5,000,000	50,000	100	1,802,500	Nov	1889	.05
35	Con. Pacific, G	Cal..	6,000 000	60,000	100	192,000	Oct.	1889	.10
36	Cons. Silver, S	Mo..	2,500,000	250,000	10	*	....	....	....
37	Crescent, S. L	Colo.	3,000,000	300,000	10	*	....	....	....
38	Crocker, S	Ariz.	10,000,000	100,000	100	135,000	Jan.	1890	.1
39	Crowell, G	N. C.	500,000	500,000	1	*	....	....	....
40	Dahlonega, G	Ga..	250,000	250,000	1	*	....	....	....
41	Dandy, G. S	Colo.	5,000,000	500,000	10	*	....	....	....
42	Decatur, S	Colo.	1,500,000	300,000	5	*	....	....	....
43	Denver City, S. L	Colo.	5,000,000	500,000	10	*	....	....	....
44	Denver Gold, G	Colo.	300,000	60,000	5	*	....	....	....
45	Durango, G	Colo.	500,000	500,000	1	*	....	....	....
46	Eastern Dev. Co., Lt.	S.	1,600,000	160,000	10	990,000	Mar.	1886	1.0
47	El Cristo, G. S. C	U.S.C	1,000,000	500,000	2	*	....	....	....
48	El Dorado, G	Cal.	1,000,000	250,000	4	*	....	....	....
49	El Talento, G	U.S.C	1,000,000	500,000	2	*	....	....	....
50	Empire, S	Utah	10,000,000	100,000	100	*	....	....	....
51	Eureka Tunnel, S. L.	Nev..	10,000,000	100,000	100	*	....	....	....
52	Exchequer	Nev.	10,000,000	100,000	100	515,000	Apl.	1889	.25
53	Found Treasure, G. S.	Nev..	10,000,000	100,000	100	30,530	Apl.	1889	2½
54	Gogebic I. Syn.,	Wis.	5,000,000	200,000	25	*	....	....	....
55	Gold Cup, S	Colo.	500,000	500,000	1	*	....	....	....
56	Golden Era, S	Mon.	2 000,000	200,000	10	*	....	....	....
57	Gold Placer, G	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.25
58	Gold Rock, G	Cal.	1,000,000	500,000	2	*	....	....	....
59	Gouldsboro, G	Cal..	10,000,000	100,000	100	*	....	....	....
60	Grand Belt, C	Tex.	12,000,000	120,000	100	*	....	....	....
61	Grand Duke	Colo.	800,000	80,000	10	*	....	....	....
62	Great Remance, G	U.S.C	1,000,000	500,000	2	*	....	....	....
63	Gregory-Bobtail, G	Colo.	550,000	550,000	1	*	....	....	....
64	Gregory Con., G	Mon.	3,000,000	300,000	10	*	....	....	....
65	Hamilton M. & M'f'g.	Cal.	1 000,000	200,000	5	*	....	....	....
66	Head Cent. & Tr.s.s	Ariz.	10,000,000	100,000	100	*	....	....	....
67	Hector, G	Cal..	1,500,000	300,000	5	45,000	Jan.	1889	.15
68	Highland, C	Mich	500,000	25,000	20	*	....	....	....
69	Hollywood	Cal..	200,000	100,000	2	*	....	....	....
70	Hortense, S	Colo.	2,000,000	200,000	10	*	....	....	....
71	Huron, C	Mich	1,000,000	40,000	25	280,000	May	1887	3.0
72	Independence, S. Silver, S	N. M.	2,000,000	200,000	10	*	....	....	....
73	Ironton, I	Wis.	1,000,000	40,000	25	*	....	....	....
74	Iroquois, C	Mich	1,250,000	50,000	25	*	....	....	....
75	J. D. Reymert	Ariz.	10,000,000	100,000	100	*	....	....	....
76	Julia Cons., G. S.	Nev..	11,000,000	110,000	100	1,660,000	Jan.	1889	.10
77	Lacrosse, G	Colo.	1,000,000	100,000	10	*	....	....	....
78	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	*	....	....	....
79	Mayflower Gravel	Cal..	1,000,000	100,000	10	585,000	Mar.	1890	.56
80	Medora, G	Dak.	250,000	250,000	1	*	....	....	....
81	Mexican, S	Nev..	10,000,000	100,000	100	2,800,760	Dec.	1889	.25
82	Middle Bar	Cal..	400,000	200,000	2	*	....	....	....
83	Mike & Starr, S. L.	Colo.	1,000,000	200,000	5	*	....	....	....
84	Mills Wilson	Colo.	2,000,000	100,000	2	*	....	....	....
85	Monitor, G	Colo.	100,000	1,000,000	1	*	....	....	....
86	Mutual Mg. & Sm.	W'sh	100,000	100,000	1	*	....	....	....
87	Native, C	Mich	1,000,000	40,000	25	*	....	....	....
88	Neath, G	Colo.	1,000,000	100,000	10	*	....	....	....
89	Nevada Queen, S	Nev	10,000,000	100,000	100	250,000	Oct.	1889	.25
90	New Germany, G	N. S.	100,000	100,000	1	*	....	....	....
91	New Pittsburg, G	Cole.	2,000,000	200,000	10	*	....	....	....
92	N. Commonw'h, S	Nev.	10,000,000	100,000	100	60,000	Apl.	1889	....

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Aug. 16. H.	Aug. 16. L.	Aug. 18. H.	Aug. 18. L.	Aug. 19. H.	Aug. 19. L.	Aug. 20. H.	Aug. 20. L.	Aug. 21. H.	Aug. 21. L.	Aug. 22. H.	Aug. 22. L.	SALES.
Adams	....	.....	....	....	1.50	....	1 50	.....	....	....	....	....	200
Alice, Mont.	....	.....	....	....	2.80	2 70	2.70	....	2.75	2 70	2.75	....	1,000
Atlantic, Mich.	23 13	....	....	....	....	....	....	....	....	....	....	....	100
Belcher, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Bodie Cons., Cal.	....	.....	....	....	....	....	....	....	....	....	....	....	600
Bos. & Mont., Mont.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Breece, Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	200
Bulwer, Cal	....	....	....	....	....	....	....	....	....	....	....	....	.....
Caledonia	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Calumet & Hecla.	301½	.....	....	....	....	....	....	....	....	....	....	....	10
Chrysolite	.25	....	.27	....	....	....	....	....	.29	....	....	....	400
Colorado Central	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Confidence, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Cons. Cal. & Va., Nev.	3.75	3.55	....	....	....	....	3 75	....	....	....	4.00	....	750
Crown Point, Nev	....	.....	....	....	2 56	..	2.50	....	....	....	....	....	200
Deadwood, Dak	....	.....	....	....	....	....	....	....	1 35	....	....	....	100
Dunkin, Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Eureka Con.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Excelsior, Cal	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Father de Smet	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Franklin,	....	.....	....	....	....	....	....	....	....	....	....	....	400
Freeland, Colo.	.40	....	....	....	....	....	....	....	.38	....	....	....	1,000
Gould & Curry, Nev.	2 00	....	....	....	2.00	....	....	....	....	....	....	....	200
Hale & Norcross, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	100
Holyoke	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Homestake, Dak.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Horn-Silver, Ut.	3.50	....	3 60	3.50	3.55	3.50	3 65	3.50	....	....	3 55	....	2,769
Independence, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Iron Silver	..	.....	....	....	....	....	....	....	....	....	2.05	....	500
Kearsarge	..	.....	....	....	....	....	....	....	....	....	....	....	.....
Leadville Co., Colo.	....	.....	.12	....	.13	....	.13	.12	.12	....	.12	....	5,800
Little Chief, Colo.	.33	.....	.36	.33	.38	.37	.38	....	.38	....	.38	....	5,100
Martin White, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Mono, Cal	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Navajo, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
N. Belle Isle, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Ontario, Ut.	....	.....	....	....	45 25	....	45.13	....	45.25	45.13	45.50	....	200
Ophir, Nev.	4.80	.....	....	....	4.65	....	....	....	....	....	4.60	....	300
Osceola, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Plymouth, Cal.	....	.....	....	....	4.00	....	4.00	....	....	....	....	....	500
Quicksilver, Pref	....	....	42 50	42.00	43.00	....	....	....	42.00	....	....	....	600
" Com.	....	.....	8.75	8.25	....	....	8 50	8 00	....	....	....	....	1,500
Quincy, Mich.	126½	.....	....	....	....	....	130¾	....	....	....	....	....	70
Robinson Cons. Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Sierra Nevada, Nev.	1.20	.....	....	....	....	....	....	....	....	....	....	....	900
Silver Cord.	.35	.....	....	....	....	....	....	....	....	....	....	....	506
Silver Mg. of L. V.	.53	.....	....	....	....	....	....	....	.85	....	....	....	600
Silver King, Ariz.	....	.....	....	....	....	....	....	....	....	.65	....	....	50
Small Hopes	.90	.....	....	....	....	....	....	....	....	....	....	....	300
Standard	....	.....	.69	....	.70	....	.67	....	....	....	....	....	1,100
Stormont, Utah	....	....	05	....	....	....	....	....	....	....	....	....	200
Tamarack, Mich	207¾	.....	....	....	....	....	....	....	....	....	....	....	13
Yellow Jacket, Nev.	3 20	.....	....	....	....	....	....	....	....	....	....	....	300

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Aug. 16. H.	Aug. 16. L.	Aug. 18. H.	Aug. 18. L.	Aug. 19. H.	Aug. 19. L.	Aug. 20. H.	Aug. 20. L.	Aug. 21. H.	Aug. 21. L.	Aug. 22. H.	Aug. 22. L.	SALES.
Alloues, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Alta, Nev.	1.15	....	1.15	.....	1.15	...	1.20	....	1.20	...	1 25	...	700
Andes, Nev.	....	....	....	.....	....	....	....	....	....	....	....	....	.....
Amador, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Astoria, Cal.	.01	....	....	....	....	....	....	....	....	....	....	....	600
Bechtel	....	....	....	....	....	....	....	....	....	....	....	....	.....
Best & Belcher, Nev.	3.00	....	....	....	....	....	....	....	....	3.30	....	....	200
Bonanza King, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Brunswick, Cal.	.09	.08	.10	.07	.10	.09	.11	.10	.10	.09	.11	.09	13,000
Bullion, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Eutte & Bost., Mont.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Castle Creek, Id.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chollar, Nev	2.60	....	....	....	2 70	....	....	....	....	....	2.65	....	300
Col. & Beaver, Id.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Commonw, Nev.	3 00	....	....	....	....	....	....	....	....	....	....	....	105
Comstock T., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
" bonds.	....	....	....	....	....	....	....	....	....	....	....	....	.....
" scrip	....	....	....	....	....	....	....	....	....	....	....	....	.....
Con. Imperial, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Denver City, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
El Cristo, Rep. of Col.	.80	....	.80	....	....	....	....	....	....	....	....	....	400
Exchequer	....	....	....	....	....	....	....	....	....	....	....	....	.....
Huron, Mich.	7.13	....	....	....	....	....	....	....	7 63	....	....	....	300
Julia, Nev.	.35	....	35	....	....	....	....	....	.40	....	.40	....	1,000
Justice Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Kingst'n & Pemb'ke	....	....	....	....	....	....	....	....	....	....	....	....	.....
Kossuth	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lacrosse, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lee Basin, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mexican, Nev	3 15	....	....	....	....	....	2 70	....	....	....	3.35	....	300
Minn Iron Co., Mich	....	....	....	....	....	....	....	....	....	....	....	....	.....
Monitor	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mutual Sm. & M. Co	1.55	....	1 60	....	....	....	....	....	1.55	....	1 55	....	1,000
Nevada Queen, Nev.	.70	....	....	....	....	....	....	....	....	....	....	....	200
N. Com'n'th, Nev.	....	....	....	....	....	....	....	....	2.50	....	....	....	200
Occidental, Nev.	....	....	....	....	....	....	....	....	.90	.85	....	....	800
Oriental & Mil., Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
Overman, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Phœnix of Ariz.	1.20	....	1.20	1.10	1.20	1.10	....	....	1.10	1.00	1.15	1.05	5.000
Potosi, Nev.	6.00	5.88	....	....	6.13	....	....	....	....	....	....	....	200
Rappahannock, Va	....	....	....	....	....	....	....	....	....	....	....	....	.....
Santa Fe, Ariz	....	....	....	....	....	....	....	....	....	....	....	....	.....
Santiago, U. S. C.	....	....	....	....	....	....	....	....	....	....	....	....	.....
S. Sebastian	.40	....	.45	....	....	....	....	....	.45	....	....	....	800
Scorpion	....	....	....	....	....	....	....	....	....	....	....	....	.....
Shoshone	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver Hill	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sullivan Con., Dak.	1.00	.....	1.00	....	1.60	....	1.00	.....	1.00	....	1.00	....	1,400
Sutro Tunnel, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
" Trust Cert.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sutter Creek, Cal.	1.10	....	1.10	....	1.10	....	1.20	1.10	1.20	....	1 15	....	1,700
Union Cons., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Utah, Nev.	.75	....	.85	....	1 05	....	.75	....	....	....	.95	....	1,300

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities ‡Assessment paid. §Assessment unpaid. ‖Omited July 18. Dividend shares sold, 25,092, Non-dividend shares sold, 35, 00. Total New York, 61,562

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Aug 15.	Aug. 16.	Aug. 18.	Aug. 19.	Aug. 20.	Aug. 21.	SALES.
Atlantic, Mich.	....	28.75	23 13 23.0	23.50 23 00	23 38	23 25 22.75	1,140
Bodie, Cal.	....	....	....	....	....	....	.....
Bonanza Developm't	....	....	.85	.85	....	....	200
Bost. & Mont., Mont.	60.00 59 00	60.00 59 50	60 00 59.63	59.75 59.13	59.50 59 13	59.00 58.00	2,650
Breece, Colo.	....	....	....	....	.45	....	100
Calumet & Hecla, Mich.	300 299	302 301	302 300	302	307	305 300	169
Catalpa, Colo.	....	....	.40	.41	.48	....	1,200
Central, Mich.	....	....	....	24.00	....	....	10
Chrysolite, Colo	....	....	....	....	....	....	.....
Con. Cal. & Va., Nev.	3 75	....	....	....	....	....	20
Dunkin, Colo.	....	....	....	....	....	....	.....
Eureka, Nev.	....	....	....	....	....	....	.....
Franklin, Mich.	24 13 24.00	....	25.00 24.88	25.00	25.50 25 00	25.50 25.00	1,520
Honorine, Utah	....	....	....	.12	....	....	500
Horn Silver, Utah	....	....	....	....	3 40	....	25
Kearsarge	20.50 20.00	....	....	21 00	20.00 19 00	18 75 18.00	1,625
Little Chief, Colo	....	....	.37 .32	.35	.39 .38	....	4,800
Little Pittsburg, Colo.	....	....	....	....	....	....	.....
Moulton	....	....	....	....	....	....	.....
Napa, Cal.	....	....	....	....	....	....	500
Ontario, Utah	....	....	....	....	....	....	.....
Osceola, Mich.	43 25 42.25	43.00	43.00	42.50 42 00	42.25 41.75	41 25 40.25	2,043
Pewabic, Mich.	....	....	....	....	....	....	.....
Quincy, Mich.	....	....	130 127½	130 129	....	....	111
Ridge, Mich.	....	....	....	....	....	....	.....
Sierra Nev., Nev.	....	....	....	....	....	....	.....
Silver King	.45	....	....	....	....	....	100
Stormont, Utah	....	....	.07 .06	....	....	....	800
Tamarack, Mich.	209 207	....	212	215 212	213 210	212 210	144

NAME OF COMPANY	Aug. 15.	Aug 16.	Aug. 18.	Aug 19	Aug. 20	Aug 21.	SALES
Alloues, Mich.	9 13	8 88	9.00	9 00 8.75	8 88	8.88	8 63	1,750
Arnold, Mich.	1 85	....	1.85	....	1.75	....	....	500
Aztec, Mich.	....	....	....	....	....	....	....	.....
Bowman S., Nev.	....	....	....	....	....	....	....	.....
Butte & Bost., Mont.	....	....	....	20 50 20 00	20 00	....	21.00	21.00 19.00	1,720
Centennial, Mich.	31.50	....	....	30.00 29.88	29 25 28 75	28 00 27.00	27.00 23.50	2,880
Comstock, T., Nev.	....	....	....	....	....	....	....	.....
Copper Falls Mg.	....	....	....	....	....	....	....	.....
Crescent, Colo.	....	....	....	.18 .17	.17½	.18	....	2,000
Dana, Mich	.35	....	....	.35	....	.38	....	500
Don Enrique, N. M.	....	....	....	....	....	....	....	.....
El Cristo, S. A.	....	....	....	....	....	....	....	.....
Hanover, Mich.	....	....	....	....	....	....	....	.....
Humboldt, Mich.	.50	....	....	.55 .53	.50	....	....	800
Hungarian, Mich	.45	....	....	....	....	.45	....	500
Huron, Mich.	7 13	....	....	7.25	7.25	7.50	....	400
Mesnard, Mich.	....	....	....	....	....	....	....	.....
National, Mich.	2.25	....	....	2.00	2.25	....	....	300
Native, Mich.	.23	.21	....	.25 .23	.23	.23	....	1,500
Oriental & M., Nev.	....	....	....	.06	....	....	....	500
Phœnix	....	....	....	....	....	....	....	.....
Pontiac	.48	....	....	....	.48	....	....	200
Rappahannock, Va	....	....	....	....	....	....	....	.....
Santa Fe, N. Mex.	.55	....	....	.65	.63	.60 .55	.55 .53	3,075
Shoshone, Idaho	....	....	....	....	....	....	....	.....
South Side, Mich.	....	....	....	....	....	....	....	.....
Star	....	....	....	....	....	....	....	.....
Tecumseh Mg. Co.	....	....	....	....	....	....	3 50	100
Washington, Mich	....	....	....	....	....	.35 .30	....	400

Boston: Dividend shares sold, 16 357. Non-dividend shares sold, 17,105. Total Boston, 33.462.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	Aug. 16 H.	Aug. 16 L.	Aug. 18. H.	Aug. 18. L.	Aug. 19. H.	Aug. 19. L.	Aug. 20. H.	Aug. 20. L.	Aug. 21. H.	Aug. 21. L.	Aug. 22. H.	Aug. 22. L.	Sales.
American Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cambria Iron.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cameron Coal & Iron Co	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ches. & O. RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chic. & Ind. Coal RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Col., C. & I	100	51⅜	50¾	50¾	50⅜	51⅛	50⅛	51⅛	51	50⅛	48½	50⅛	48	5,950
Col. & Hocking C. I	100	29⅝	29⅛	29⅛	29¼	29⅝	29⅜	30¾	29	29⅛	28⅜	27⅞	27½	4,200
Consolidation Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Del. & H. C.	100	....	....	....	....	....	....	162	....	161	158	161	160	2,300
D., L. & W. RR.	50	146½	145⅜	144½	143¾	145¾	144⅜	144⅞	143¾	144	141	144	141⅛	52,902
Hocking Valley.	100	30	....	29⅜	29	29½	....	29½	29¼	29	26½	29	27½	5,815
Hunt. & Broad Top	....	....	....	....	....	20½	....	....	....	20½	20	....	....	900
Do. pref.	....	....	....	46½	....	....	....	....	....	46½	46	....	....	293
Illinois Coal & Coke Co.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lehigh C. & N.	50	51¾	....	52	51⅝	52	....	52	....	....	....	....	....	345
Lehigh Valley RR.	50	52½	....	52¼	52¼	52⅛	....	52¼	....	52⅛	52	....	....	1,146
Lehigh & Wilkesb. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mahoning Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Marshall Con. Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Maryland Coal	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Morris & Essex.	100	....	....	....	....	....	....	....	....	150	....	....	....	50
New Central Coal.	50	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. J. C. R. R.	100	....	....	122¾	121¾	122½	122	....	....	121	118	121¾	119½	3,010
N. Y. & S. Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Y., Susq. & Western	100	....	....	7¾	7⅛	....	....	7⅛	7	7	....	7	....	645
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Y. & Perry C. & I.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Norfolk & Western R.R.	50	20	....	....	....	....	....	....	....	....	....	....	....	200
Do. pref.	50	63⅞	62⅛	64½	63	....	....	64	63	63	....	....	....	2,150
Penn. Coal.	50	....	....	....	....	....	....	....	....	....	....	....	....	.....
Penn. RR.	50	53⅜	53⅛	53⅜	53½	53⅛	53¼	53⅛	53⅜	53⅜	53	....	....	3.915
*Ph. & R. RR.	....	44	43¼	42¾	42	43¾	42⅛	43¾	42⅝	42¾	41½	42¾	41¼	**78,825
Sunday Creek Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tennessee C. & I. Co.	....	....	....	45	44¾	46	....	45½	45	44	....	44	43¼	1,800
Do. pref.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Westmoreland Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....

**Sales in New York, 44,790; in Philadelphia, 34,035. Total sales, 164,446.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS. Aug. 15	Aug. 16.	Aug. 18.	Aug. 19.	Aug. 20.	Aug. 21.
Alpha	.....	.....	.....	.....	.....	.....
Alta	1.05	1.05	1.05	1.10	1.05	1.15
Belcher	.....	.....	.....	.....	.....	.....
Belle Isle.	1.00	1.05	1.00	.95	.85	.95
Best & Bel.	2.80	2.10	3.00	3.20	3.05	3.40
Bodie	1.00	1.05	1.10	1.25	1.25	1.20
Bulwer	.20	.....	.20	.20	.20	.20
Challar	2.50	2.70	2.60	2.55	2.65	2.75
C'm'weal'h	2.70	.....	.....	2.45	2.50	2.50
Con. C. & V	3.65	3.75	3.70	4.00	4.00	3.65
Con. Pac.	.....	.....	.....	.....	.....	.....
Crown Pt.	2.50	2.65	2.40	2.50	2.50	2.65
Eureka C.	.....	.....	.....	.....	.....	.....
Gould & C.	1.90	2.15	2.05	2.20	2.15	2.30
Grd. Prize.	.....	.....	.....	.....	.....	.....
Hale & N.	2.30	2.50	2.40	2.45	2.35	2.55
M. White.	.....	.....	.....	.....	.....	.....
Mexican	2.90	3.05	2.60	3.15	3.00	3.20
Mono.	.30	.....	.....	.45	.50	.50
Mt. Diablo	.....	.....	.....	.....	.....	.....
Navajo	.30	.....	.30	.25	.30	.30
Nev. Queen	60	.....	60	.60	.50	.50
N. Belle I.	1.05	1.05	1 00	1.05	1.00	1.05
Occidental.	.....	.....	.....	.....	.....	.....
Ophir.	4.60	4.90	4.60	.....	4.50	4.75
Potosi.	5.63	6.38	5.88	5.88	5.63	7.32
Savage	3.60	4.20	4.00	4.15	.....	4.10
Sierra Nev	2.65	2.85	2.60	2.75	.....	2.95
Union Con	2.30	2.50	2.35	2.45	2.35	2.85
Utah	.60	.....	1.00	.60	.60	.70
Yellow Jkt	3.00	3.10	3.10	3.05	.....	3.25

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L. H.	Asked. L. H.
Atlantic Coal	....	$1.50
Balt. & N. C.	....	....
Big Vein Coal	....	....
Conrad Hill	....	10
Cons. Coal	....	....
Diamond Tunnel	28	....
George's Crk. C.	....	....
Lake Chrome	13	35
Maryland & Charlotte	....	....
North State	65	....
Silver Valley	45	50

Prices bid and asked, lowest and highest, during the week ending August 21.

Birmingham, Ala.

COMPANY.	Bid L. H.	Asked. L. H.
Ala. Coal & I. Co.	....	$100
Ala Consd. C. & C. Co.	....	$23
Ala. R. Mill Co.	$60	....
*Alice Furnace	$103	....
Anna Howe Is. Mg. Co.	$⅜	$⅞
Bess'mer Land	$34½@$35	$ 6@$6½
Bir. Mg. & Mg.	$25	$40
Cahaba Coal Mg. Co.	....	$70
Camille Gold Mg. Co.	$½	....
De Bardeleben C. & I. Co.	....	$76
Decat. L. Imp.	$13½@$14	$14¼
Decatur Min. L.	....	$22¾
Ensley Land	....	$10@$10¼
*Eureka	**$99	$102½
Florence L. & Mg. Co.	$21½	$22⅞
Gadsen Land	$5¾@$6⅞	$ ⅛@$6¼
Hecla Coal Co.	....	$20
Hen. S. & M. Co	$70@$83	$85@$87½
Jagger-Townl'y C. & C. Co.	$8½	$10
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	$20	....
Sheffield C. & I. Co.	$5 @$53	$55¼@$56
Sloss I. & S.	$44	....
†Sloss I. & S.	$92	....
††Sloss I. & S.	....	$69@$70
Tuscaloose C. I. & L. Co.	$24	$27
Tenn. C. & I. Co.	....	$45½
" pref.	$100	$105
Vulcan C. & C. Co.	$5	....
Woodstock I. Co.	....	$36@$37

Prices, highest and lowest, bid and asked during week ending August 18.

* Bonds. † First mortgage. †† Second mortgage. ** Without interest.

Pittsburg, Pa. Aug. 20.

COMPANY.	B.	A.	Closing
Allegheny Gas Co.	....	....	....
Bridgewater Gas Co.	$56.00	$61.00	$59.50
Chartiers Val. Gas	40.00	45.00	42.00
Columbia Oil Co.	2.00	3.25	2.50
Consolidated Gas Co.	....	....	....
East End E. Light Co.	....	....	....
East End Gas Co	....	....	....
Forest Oil	....	....	....
Hazlewood Oil Co.	50.00	52.00	52.00
La Noria Mining	.17	.19	.17
Luster Mg. Co.	*26.50	*30.00	*28.00
Manuf'turers Gas Co.	....	....	....
Nat. Gas Co. of W. Va	....	....	....
N. Y. & Clev. Gas Coal	....	....	....
Ohio Valley Gas	16.00@17.00		16.00
Mansfield C. & C. Co.	....	....	....
Pennsylvania Gas	13.25	....	13.25
People's Natural Gas	....	....	....
People's N. G. & P. Co.	*15.85	*16.13	*16.13
Philadelphia Co.	*30.88	*31.50	*31.25
Pine Run Gas Co.	....	....	....
Pittsburg Gas	....	25.00	25.00
Silverton Mg. Co.	1.00	....	1.00
South Side Gas	....	25.00	25.00
Tuna Oil Co.	....	....	....
Union Gas	....	....	....
Washington Oil Co.	....	....	....
W'house Brake Co.	64.00	....	64.00
W'house A. B. Co.	116.50	119.00	119.00
W'house E. Light.	39.60	40.00	39.75
W'moreland & Camb.	....	....	....
Wheeling Gas	20.00	....	20.00
Yankee Girl Mg	....	....	....

* Actual selling price.

Prices bid and asked and sales during week ending August 20:

Luster Mining	10 shs.	@$27½
People's N. G. & P. Co.	10 "	@$16
Philadelphia Co.	10 "	@$31½
West. Electric	280 "	$39@$39⅜

St. Louis. Aug. 20.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo.	$1.65	$1.62½
American & Nettie	1.70	1.77½
Aztec, N. Mex.	....	....
Bi-Metallic	35.50	....
Central Silver	.17½	.18¾
Cleveland, Colo.	.04	.05
Cleveland & An'r.	....	....
Cœur d'Alene	....	....
Elizabeth	....	....
Gold King	.04	.04
Granite Mountain, Mont.	46.00	47.00
Hope	1.90	....
I. X. L., Colo.	....	....
La Union	.06½	.09
Little Albert	.37½	....
Montrose Placer, Colo.	.68¾	.75
Major Budd, Mont.	.11½	.12½
Mexican Imp.	....	....
Mickey Breen	1.05	1.07½
Mountain Key	....	.57½
Pat Murphy, Colo.	....	.15
Puzzle	....	....
Richmond Hill	....	....
Samoa	.01½	.02
Silver Age, Colo.	1.47½	1.52½
Small Hopes, Colo.	.80	.95
Tourtelotte	.03½	.04
West Granite, Mont.	....	....
Wire Patch	.15	....
Yuma, Ariz.	.57½	.60

Foreign Quotations.

London.

COMPANY.	Highest.	Lowest.
Almada, Mex.	1s. 3d.	9d.
Amador, Cal.	£15-16	£12-13
Appalachian, N. C.	6d.	3d.
Canadian Phos, Canada	£1/8	£¼
Carlisle, N. Mex	3s. 6d.	3s.
Colorado, Colo.	£¼	£⅛
Comstock, Utah	....	....
Cordova	....	....
Cons. Esmeralda, Nev.	2s. 9d.	2s. 3d.
Denver Gold, Colo.	9d.	3d.
Dickens Custer, Idaho	1s. 3d.	9d.
East Arevalo, Idaho	2s.	1s.
El Callao, Venezuela	£1⅞	£1⅝ 7/16
Elmore, Idaho	2s. 6d.	2s.
Empire, Mont	1s. 3d.	9d.
Garfield, Nev.	1s 6d.	6d.
Jay Hawk Mont	2s. 6d.	1s. 6d.
Josephine, Cal	1s. 6d.	1s.
Kohinoor, Colo.	2s. 3d	1s. 9d.
La Luz, Mex.	1s.	6d.
La Valera, Mexico	17s. 6d.	17s. 6d.
Montana Lt., Mont	18s. 6d.	17s. 6d.
New California, Colo.	6s. 6d.	6s.
New Consolidated	9d.	3d.
New Eberhardt, Nev.	1s. 3d.	9d.
New Emma, S., Utah	4s.	3s. 6d.
New Flagstaff, Utah	3s. 3d.	2s. 9d.
Newfoundland, N. F.	3s. 6d.	3s.
N Gold Hill, N. C.	1s 3d.	9d.
New Guston, Colo.	£4⅛	£4⅛
New Hoover Hill, N. C.	1s. 3d.	9d.
Old Lout, Colo.	£⅛	£⅜
Palmarejo, Mex	14s 6d.	13s. 6d.
Pinos Altos, Mex.	£ 1-16	£9-16
Pittsburg Cons., Nev.	£5-16	£¼
Richmond Con., Nev.	£1	£¾
Ruby & Dunderberg, Nev	1s.	9d.
Sam Christan, N. C.	1s.	6d.
Sierra Buttes, Cal.	4s.	3s.
" Plumas Eur.	£13-16	£11-16
Sonora Mex.	1s.	6d.
United Mexican, Mex.	7s. 6d.	6s. 6d.
U. S. Placer, Colo.	1s. 6d.	1s.
Viola Lt., Idaho	1s. 6d.	1s.

Highest and lowest prices during the week ending August 9.

Trust Stocks. Aug. 22.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.	
Am. Cotton Oil. Tr. Repts.	$26⅛@$26⅝
Cattle Trust	13 @ 15½
Distillers' & Cattle Feeders'.	44⅛@ 45
Linseed Oil	49 @ 51
National Lead	20⅞@ 21⅛
Standard Oil	165 @169
Sugar Refineries	77⅛@ 77¾

Sales at the New York Stock Exchange week ending Aug. 22:

	Sales.	Price—H.	L.
*American Cotton Oil	12,035	29¼	25
National Lead	62,140	22⅛	20
Sugar	118,846	82¾	75⅛

* Trust receipts.

Paris. August 7.

	Francs.
Belmez, Spain	720.00
Callao, Venez.	56 75
Callao Bis, Venez.	6.50
East Oregon, Ore.	5.50
Forest Hill Divide, Cal.	100.00
Golden River, Cal	350.00
" " parts	30.00
Lexington, Mont.	125.00
" parts	3.75
Rio Tinto, Spain	570.00
Tharsis, Spain	143 75

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ℔ 100 lbs	$1.75@$2.00
Muriatic, 18°, ℔ 100 lbs	1.00@1.50
Muriatic, 20° ℔ 100 lbs	1.12½@1.75
Muriatic, 22° ℔ 100 lbs	1.37½@2.00
Nitric, 36°, ℔ 100 lbs	4.00@4.26
Nitric, 42°, ℔ 100 lbs	6.00@6.25
Oxalic, ℔ 100 lbs	6.50@10.50
Sulphuric, 60°, ℔ 100 lbs	80@1.25
Sulphuric, 66°, ℔ 100 lbs	1.00@1.75
Alkali—	
Refined, 48 p. c	@2¾
Refined. 58°	2¾@3
Alum—Lump, ℔ lb	1¾
Ground, ℔ lb.	1¾@2
Lump. ℔ ton, Liverpool	£4 17 6
Sulphate of Alumina, ℔ ton	£4 10
Aqua Ammonia—18°, ℔ D	4¾
20°, ℔ D	6
22°, ℔ D	6@7
26°, ℔ D	10@11
Ammonia—Sul., ℔ 100 lbs	3.15
Carb., per lb	7¼@8¼
Arsenic—White, powdered, ℔ lb.	3¼@3½
Red, ℔ lb	5¾@6¾
White, at Plymouth, ℔ ton	£12 2 6d.
Asbestos—Am., p. ton	$50@$300
Italian, p. ton, c. i. f. L'pool	£18@£60
Asphaltum—P. ton	13.00
Prime Cuban, ℔ D	4½@5½c
Hard Cuban, ℔ ton	$28.00
Trinidad, refined, ℔ ton	$30.00
Barytes—Sulph., Am. prime white	17@20
Sulph., foreign, floated, p. ton	19½@21.50
Sulph., off color, p. ton	11.50@14.00
Carb., lump, f.o.b. L'pool, ton	£6
No. 1, casks, Runcorn	"£4 10 0
No. 2, bags, Runcorn	" " 3 15 0
Bleach—Over 35 p.c., ℔ lb	2@2½
Borax—Refined, ℔ lb	9½@9⅝
Concentrated	7¾@8⅝
Refined at Liverpool, ℔ ton	£29
Brimstone—*See Sulphur.*	
Bromine—℔ lb	37@38
Chalk—℔ ton	1.75
Precipitated, ℔ lb.	4¾@5
China Clay—English, ℔ ton	13.50@18.50
Southern, ℔ ton	13.50
Chrome Yellow—℔ lb	10@25
Cobalt—Oxide, ℔ lb	2.60@2.90
Copper—Sulph. English Wks, ton	£20@£21
Copperas—Common, ℔ 100 lbs	70
Best, ℔ 100 lbs	75@1.00
Liverpool, ℔ ton, in casks	£1 15s.
Cream of Tartar—Am. 99%	22½
Powdered, 99 p. c.	23
Emery—Grain, ℔ lb	4½@5
Flour, ℔ lb	2½@3½
Feldspar—Ground, ℔ ton	15.00
Fuller's Earth—Lump, ℔ bbl.	.90@.95
Powdered, ℔ lb	1¾@2
Gypsum—Calcined, ℔ bbl.	1.25@1.50
Iodine—Resublimed	2.75
Kainit—℔ ton	$9.25@$9.75
Kaolin—*See China Clay.*	
Lead—Red, ℔ lb	6¾@9
White, American, in oil, ℔ lb	6¾@7¼
White, English, ℔ lb	8½@8¾
Acetate, or sugar of, white	12@13
Lime Acetate—Amer. Brown	.95@1.00
" Gray	1.75@1.87½
Litharge—Powdered, ℔ lb	6¼@6¾
English flake, ℔ lb	9@9½
Magnesite—Greek, ℔ ton	20.00
Manganese—Crude, per unit	.23@.28
Oxide, ground, per lb	2¼@6½
Mercuric-Chloride—(*Corrosive Sublimate*) ℔ lb	70@72
Mineral Wool—℔ lb	2
Mica—In sheets according to size, 1st quality, ℔ lb	25@$6.00
Ochre—Yellow, "B. F.," ℔ ton, f.o.b. mill	30.00
"J. F. L. S.," ℔ lb. ex dock	2½
Phosphate Rock—S. Carolina, per ton f. o. b. Charleston	5.75@7.00
Ground, ex vessel New York	11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton	16.00
Phosphorus—℔ lb	70@75
Plumbago—Ceylon, ℔ lb	4@5
American, ℔ lb	5@7
Potassium—Cyanide, ℔ lb	.39@40
Bromide, ℔ lb	33
Chlorate, ℔ lb	13@10
Carb. ℔ lb	4.70@5.54
Caustic, ℔ lb	7½@8
Iodide	2.65@2.70
Muriate, ℔ 100 lbs	1.77½@1.80
Nitrate, refined, ℔ lb	6@8
Bichromate, ℔ lb	10½@11
Sulphate, ℔ 100 lbs	2.30@2.35
Yellow Prussiate, ℔ lb	17½@18
Red Prussiate, ℔ lb	42@45
Pumice Stone—Select lumps, lb.	3¼
Original cks., ℔ lb	1¾@2
Powdered, pure, ℔ lb	2¼@2½
Pyrites—Non-cupreous, p. units	10d
Quartz—Ground, ℔ ton	14.00@16.00
Rotten Stone—Powdered, ℔ lb	3¼@3½
Lump, ℔ lb	6@10
Salt—Liverpool, ground ℔ sack	75@80
Turk's Island, ℔ bush	25@28
Salt Cake—℔ lb	60@62½
Saltpeter—Crude, ℔ lb	5¼@5¾
Refined, ℔ lb	6@8
Soda Ash—Carb., 48 ℔ 100 ℔	2¾
Caustic, 48 ℔	2¼@2½
Soda Caustic, 60%	3.25@3.35
" 70%	3.00
" 74-76%	2¾
Sal, English, ℔ 100 lbs	1½@1¾
Sal, American, ℔ 100 lbs	.90
Nitrate, 100 lbs	1.70
Strontium—Nitrate ℔ lb	9@9½
Sulphur—Roll, ℔ lb	1¾
Flour, ℔ lb	2@
Crude Brimstone, 2s., ℔ ton	19.00@19.29
Crude Brimstone, 3ds, ℔ ton	18.50@18.70
Talc—Ground French, ℔ lb	1¼@1½
Domestic, ℔ ton	$18@$20
c. i. f. Liverpool, ℔ ton	£4 5
Vermillion—American, ℔ lb	61
English, ℔ lb	82@85
Vitriol—(Blue), Ordinary, ℔ lb	5¼@5½
Extra, ℔ lb	7
Zinc Oxide—Am., Dry, ℔ lb	4½
Antwerp, Red Seal, ℔ lb	6@6½
Paris, Red Seal, ℔ lb,	6½@7

* Spot.

THE RARER METALS.

Aluminum—(Metallic), ℔ lb.	$2.@$2.50
Sheet, per lb	2.50
Arsenic—(Metallic), per lb	.40
Barium—(Metallic), per gram	$4.00
Bismuth—(Metallic), per lb	2.75
Cadmium—(Metallic), per lb	1.00
Calcium—(Metallic), per gram	10.00
Cerium—(Metallic), per gram	7.50
Chromium—(Metallic), per gram	1.00
Cobalt—(Metallic), per lb	6.00
Didymium—(Metallic), per gram	9.00
Erbium—(Metallic), per gram	7.50
Gallium—(Metallic), per gram	140.00
Glucinum—(Metallic) per gram	12.00
Indium—(Metallic), per gram	9.00
Iridium—(Metallic), per oz	7.00
Lanthanum—(Metallic), per gr.	15.00
Lithium—(Metallic), per gram	10.00
Magnesium—Per lb	4.50
Manganese—Metallic, per lb	1.10
Chem. pure, per oz.	10.00
Molybdenum—(Metallic), per gm.	.50
Niobium—(Metallic), per gram	5.00
Osmium—(Metallic), per oz	65.00
Palladium—(Metallic), per oz.	35.00
Platinum—(Metallic), per oz.	15.00
Potassium—Metallic, per lb	28.00
Rhodium—(Metallic), per gram.	5.00
Ruthenium—(Metallic), per gm.	5.50
Rubidium—(Metallic), per gram	2.00
Selenium—(Metallic), per oz.	1.80
Sodium—(Metallic) per lb.	2.50
Strontium—(Metallic), per gm.	.60
Tantallum—(Metallic) per gram	9.00
Telurium—(Metallic) per lb.	5.00
Thallium—(Metallic) per gram	.25
Titanium—(Metallic) per gram	2.25
Thorium—(Metallic) per gram	17.00
Tungsten—(Metallic) per oz.	2.25
Uranium—(Metallic), per lb.	5.00
Vanadium—(Metallic), per gm.	22.00
Yttrium—(Metallic), per gram	9.00
Zirconium—(Metallic) per oz.	65.00

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000	3 00@3.25
Jerseys, ℔ 1,000	4.50@5.00
Up Rivers, ℔ 1000	5.00@5.50
Haverstraw seconds, ℔ 1000	5.25@5.50
Haverstraw firsts, ℔ 1,000	5.5C@6.00
Fronts, nominal, ℔ 1000.	
Croton	14.00@16.00
Wilmington	20.00@21.00
Philadelphia	@22.00
Trenton	@22.00
Baltimore	
Building Stone—Amherst freestone, ℔ cu. ft.	95@1.00
Brownstone, ℔ cu. ft.	1.00@1.35
Granite, rough, ℔ cu.ft.	45@1.25
Granite, Scotch ℔ cu. ft.	1.00@1.15
Cement—Rosendale, ℔ bbl	.85@1.10
Portland, American, ℔ bbl.	2.15@2.45
Portland, foreign, ℔ bbl.	2.40@2.50
Portland, " special brands.	2.60@2.85
Roman, ℔ bbl.	2.75@2.90
Keene's coarse, ℔ bbl.	4.50@5.50
Keene's fine, ℔ bbl.	7.25@8.50
Slate—Purple and green roofing, ℔ 100 ft.	7.00@7.50
Red roofing, ℔ 100 sq. ft.	12.00
Black, roofing, ℔ 100 sq. ft.	4.25@5.50
Lime—Rockland, common ℔ bbl.	1.00
Rockland, finishing, ℔ bbl.	1.20
St. John, com. and finish, ℔ bbl.	.90@.95
Glens Falls, com. and fin., ℔ bbl	.85@1.10
Labor—Ordinary, ℔ day	1.50@2.00
Masons, ℔ day	4.00
Plasterers, ℔ day	4.00
Carpenters, ℔ day	3.50
Plumbers, ℔ day	3.50
Painters, ℔ day	2.50@3.50
Stonesetters, ℔ day	3.50@4.00
Tilelayers, ℔ day	3.50@4.50
Bricklayers, ℔ day	4 00

THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.